

PUTTING SAN DIEGO COUNTY ON THE HIGH ROAD

Climate Workforce Recommendations for 2030 and 2050

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Executive Summary

The San Diego region has embarked on an ambitious path to decarbonize its economy—a complex process that requires significant government action to lower greenhouse gas emissions in a variety of the region’s industries. The decarbonization framework will affect specific jobs and occupations and holds both promise and challenges for workers and residents. Fear of negative employment impacts can be a source of highly charged resistance to climate actions. However, with intentional policies and strategic capital investments, climate action can protect and increase high-quality jobs and access to them. This approach is what we call the “high road” to a carbon-neutral economy.

In considering the economics of climate policy, it is important to remember that any potential costs of climate actions must be compared to the cost of not mitigating climate change. The U.S. federal government’s Fourth National Climate Assessment, for example, predicts severe disruptions to the economy if actions are not taken to curb and mitigate climate change.²

Bold climate action is the necessary response to this urgency. Beyond curbing emissions, the investments that climate action requires can usher in a host of co-benefits, making our communities and economies more resilient. Decarbonization can lower energy costs, increase access to clean energy, ensure safer and healthier homes and communities, reduce environmental burdens, and expand economic opportunity and good jobs. This last component, good jobs in the context of climate action in the San Diego region, is the focus of this paper.

Protecting workers and maximizing shared prosperity for working families while pursuing climate goals requires specific and intentional social policy.³ Without incorporating workforce goals into climate policy, the transition to a carbon-neutral economy may simply replicate—or even exacerbate—deep-seated trends of wage inequality and disparities by race and gender.⁴ As changing energy uses reshape the economy, “Workers will experience changes unequally; some good jobs will disappear, and, without policy intervention, they could be replaced by low-wage jobs.”⁵

The growth of low-wage jobs in clean energy has implications for the broader economy and can even hamper climate actions themselves, as low wages make it difficult to attract and retain the highly-skilled and well-trained workforce. In the installation of renewable energy systems, for example, research shows a strong correlation between the quality of the installation work and the systems’ ability to perform at the optimal level.⁶ The ability to utilize new and emerging technologies to mitigate and adapt to climate change will depend on the engagement of a qualified workforce. Ensuring the creation of high-road jobs is key. High-road jobs are a win-win approach for employers and community: employers gain access to skilled and committed workers, and community members gain access to good careers.

² USGCRP, “Climate Science Special Report: Fourth National Climate Assessment, Volume I” (U.S. Global Change Research Program, Washington, DC, 2017), <https://science2017.globalchange.gov/>.

³ Carol Zabin et al., “Advancing Equity in California Climate Policy: A New Social Contract for Low-Carbon Transition,” September 13, 2016, <https://laborcenter.berkeley.edu/advancing-equity/>.

⁴ Ian Eve Perry, “Low-Wage Work in California Data Explorer” (UC Berkeley Labor Center, August 16, 2018), <https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf>.

⁵ Carol Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030” (UC Berkeley Labor Center; California Workforce Development Board (CWDB), June 2020), <https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf>.

⁶ J.C. Wiles, B. Brooks, and B.-O. Schultze, “PV Installations, a Progress Report,” in *Conference Record of the Twenty-Ninth IEEE Photovoltaic Specialists Conference*, 2002, 2002, <https://ieeexplore.ieee.org/document/1190885>.

What are High-Road Jobs?	
Job quality: <ul style="list-style-type: none"> • Family-supporting wages and benefits • High standards for health and safety • Long-term career pathways • Worker protections including the right to organize 	Job access: <ul style="list-style-type: none"> • Access and entry-points to good jobs for local workers • Training to support advancement

Beyond social policy to ensure job quality and improved access to clean energy-related jobs, the choice of climate solutions and investments also matters. Solar PV, battery storage, and building electrification, while critical, will do little to comfort pipefitters or gas utility workers, whose skills do not map well to an all-electric future. Furthermore, wind, solar, and efficiency alone cannot fully decarbonize the economy. According to the Net Zero America study by researchers at Princeton University, hydrogen, biomass, carbon capture and storage, hydrogen, advanced nuclear, and geothermal will be important solutions to a fully decarbonized economy.⁷ The federal Bipartisan Infrastructure Law provides billions of dollars through the Department of Energy to support the demonstration and deployment of such climate solutions.⁸

In the San Diego region, researchers do not project job loss due to climate action up to the year 2030.⁹ After 2030, however, employment in fossil fuel sectors is expected to contract. An employment contraction rate of -75% in the county's natural gas sector has been estimated for the period from 2031 to 2050. The modeling used for the San Diego Regional Decarbonization Framework (RDF) indicates that decarbonization will result in net job creation overall. However, creating jobs is not enough to prevent negative impacts on workers.

If the emerging jobs are not at least as high-quality as the jobs being lost, workers will lose out. If the emerging jobs are in substantially different occupations and more distributed energy industries, incumbent energy-sector workers could face a difficult transition. There are therefore multiple aspects to protecting affected workers: those who can be redeployed in the low-carbon economy must remain securely employed at comparable skill and compensation levels; and those who face job loss must be provided with retraining, bridges to retirement, or other measures to preserve their financial security. These are challenging objectives, but achieving them is possible and requires careful planning that must begin now. While opportunities to avoid job loss are accentuated in this paper, it also covers recommendations to ensure a just transition when job loss is not altogether avoided.

⁷ Eric Larson et al., "Net-Zero America: Potential Pathways, Infrastructure, and Impacts - Final Report Summary" (Princeton University, October 29, 2021), [https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20\(29Oct2021\).pdf](https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20(29Oct2021).pdf).

⁸ "Building a Better America: A Guidebook to the Bipartisan Infrastructure Law for State, Local, Tribal, and Territorial Governments, and Other Partners" (The White House | President Joe Biden, January 31, 2022), https://www.whitehouse.gov/wp-content/uploads/2022/01/BUILDING-A-BETTER-AMERICA_FINAL.pdf.

⁹ Robert Pollin et al, Chapter 6. Employment Impacts through Decarbonization for the San Diego Region in "San Diego Regional Decarbonization Framework" (UC San Diego - School of Global Policy and Strategy; SDG Policy Initiative, Draft - October 2021).

Our approach here begins with the premise that San Diego climate policy can and should generate safe, family-sustaining career-track jobs; broaden professional and economic opportunities for workers from underrepresented communities; and support workers and communities whose livelihoods depend on carbon-intensive industries at risk of decline as decarbonization proceeds. There already exist feasible, road-tested workforce and economic development mechanisms that are complementary to climate policy, and that can be utilized to improve outcomes for workers. Successful examples of strategies and investments to improve job quality and job access shows that it is possible to design climate policy that leads to good outcomes for workers.

The recommendations herein are based on a study prepared in 2020 for the State of California, entitled “Putting California on the High Road: A Jobs and Climate Action Plan for 2030” as well as more recent sectoral research and geographic analysis by Inclusive Economics.¹⁰ The recommendations in this report follow the climate policies and job impacts charted in the San Diego Regional Decarbonization Framework (RDF). Where the RDF leaves out critical areas of climate investment that could avoid worker displacement, this paper flags them. Designed as a toolkit for policymakers in the San Diego region, this paper identifies social policies and capital investment opportunities to ensure a just and high-road transition to a carbon-neutral San Diego region.

Social policies include adoption of labor standards and job access agreements. Labor standards can include responsible contractor pre-qualification, skill certifications, apprenticeship requirements, or wage and benefit thresholds. Job access can be achieved through targeted or local hire standards, inclusive procurement, and first-source hiring agreements with specific training programs. For large construction projects or aggregated small projects, these standards are best adopted through collective bargaining agreements such as project labor agreements or community workforce agreements. For large non-construction projects, community benefits agreements can be used. For smaller or private projects, labor standards are best adopted through both regulation and incentives, i.e. tying permits, leases, rebates or subsidies to certain labor conditions.

Targeted capital investments are suggested for a couple of reasons. First, some specific infrastructure-scale investments could contribute to decarbonization efforts while redeploying workers currently involved in fossil fuel-related infrastructure and use, in activities that require their same skills and qualifications. Second, targeted investments can be used to mitigate job quality and other equity concerns that are particularly acute in some decarbonization activities, e.g., building decarbonization, distributed solar. Targeted public investments in such sectors can improve equity and inclusion for both beneficiaries and for individuals working on these projects. The table below shows the crosswalk between the RDF and the specific social policies and capital investment opportunities detailed further in this report.

¹⁰ Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

Sector ¹¹	Climate Strategy from RDF	High-Road Policy and Investment Recommendations
BUILDINGS		
Electrification	Increase adoption of heat pumps for water heating and space heating/cooling in new and existing buildings, with particular assistance for low-income residents and rental housing.	<p>Condition financial incentives for end-use electrification on responsible contractor criteria, including evidence of a skilled workforce.</p> <p>Support onsite water reuse to make up for reduced gas plumbing work in new buildings.</p> <p>Require “skilled and trained” workers are involved in large-scale commercial building decarbonization projects.</p> <p>Develop a fund for deep decarbonization of the region’s affordable housing to support high-road jobs in this sector while reducing energy burdens for low-income renters.</p> <p>Support electric-ready buildings by aggregating neighborhoods for electric service upgrades, performed by pre-qualified contractors.</p>
	Minimize extensions of the gas distribution system and accelerate depreciation of existing utility assets.	Make up loss of work hours for pipefitters, operating engineers, laborers and other trades with investments in other public infrastructure related to climate resilience (e.g. water infrastructure, district energy installation, geothermal drilling, etc.)
	Targeted gas system retirements	Invest in renewable district energy systems (using solar, geothermal, or other clean energy sources) that require the same skills and occupations as the gas distribution system.

¹¹ Sectors aligned with Table 8.3 - CAP Policy Categories in “San Diego Regional Decarbonization Framework.”

Energy Efficiency	Implement energy efficiency improvements	<p>Support deep energy efficiency in Municipal, University, School, and Hospital (MUSH) sector buildings with labor standards.</p> <p>Implement energy efficiency upgrades in the region's public buildings under a Community Workforce Agreement, to ensure union wage and benefit standards and expand hiring of workers from disadvantaged communities.</p>
Low Carbon Fuels	Research and pilot production of low-carbon gaseous fuels (e.g., “waste-to-energy” biomethane and green hydrogen with direct air capture) for hard to electrify end uses.	Develop regional partnerships with industry and labor unions to pilot Waste-to-Energy and Hydrogen projects and apply for federal funding.
ENERGY		
Grid Supply	2-4 new 100MW clean power plants annually	<p>Construction: Require community workforce agreements (CWAs), i.e. project labor agreements with local and or targeted hire.</p> <p>Operations: Condition permits on labor-management partnerships or collective bargaining agreements to ensure job quality.</p>
	Transmission upgrades	Implement highest safety and workforce skill standards.
	Firm geothermal power (transfer with Imperial County)	Condition permits on labor-management partnerships or collective bargaining agreements to ensure job quality.
	Clean dispatchable power	Explore geothermal, biomass, advanced nuclear, and hydrogen energy solutions, which provide work opportunities for existing thermal energy workers.

Customer Side Supply	Maximize rooftop and infill solar and storage	<p>Identify program models that increase the scale of projects.</p> <p>Support models of distributed solar that are community scale rather than on individual homeowners' roofs, to both lower costs per MW and to facilitate contracting models that can require labor standards.</p> <p>Expand community solar with labor standards and opportunities for local residents to pursue career-track training, such as registered apprenticeships.</p>
	Long and short-duration energy storage	Require installers of all battery energy storage systems, including residential, to hold C-10 electrical contractor's license, which requires the use of certified electricians.
All Energy Subsectors		Incorporate responsible employer prerequisites in incentive programs that require compliance with all applicable labor and employment laws and set family-sustaining wage and benefit standards.
TRANSPORTATION		
Electrification Alternative Fuel Vehicles and Equipment (Electrification)	Public electric vehicle (EV) charging	<p>Require the use of EVITP-certified electricians.</p> <p>Ensure pre-apprenticeship programs to help disadvantaged workers access and succeed in electrician apprenticeship.</p>
	Fleet adoption	Utilize U.S. Employment Plan (USEP) , see below) from Jobs to Move America to support good jobs and targeted hire in manufacturing of buses and train cars.
	EV charging on new developments	Require the use of EVITP-certified electricians.
	EV charging on parking retrofits	Require the use of EVITP-certified electricians.

	Vehicle purchase incentives	<p>Avoid public expenditures on subsidizing private vehicle purchases.</p> <p>Incentivize cleaner vehicles for TNCs, attaching responsible employer policies to subsidies.</p>
	Multi-family housing EV charging	Require the use of EVITP-certified electricians.
	Electrified freight and efficient distribution	Support EV charging for freight at distribution centers, and preference rates and charging access on firms that utilize employees rather than independent contractor distribution and delivery drivers.
VMT Reduction	Expand transit services (bus and rail)	<p>Require community workforce agreements (CWAs) on infrastructure expansion.</p> <p>Expand funding for public transit operations, maintaining current high road labor standards.</p> <p>Support innovative programs that incorporate micro-transit services for first- and last-mile mobility as part of public transit systems.</p>
	Infill and transit-oriented development	<p>Encourage development to zoning capacity limitations and 4+ story buildings, requiring apprenticeship-trained craft laborers.</p> <p>On competitive grants for infill projects, include scoring criteria that factor in job quality and job access.</p> <p>Participate in High Road Construction Careers, a statewide initiative that includes pre-apprenticeship training.</p>

	Invest in TNC partnerships in rural and non-infill areas, prioritizing electric vehicles (EVs) and high occupancy vehicles (HOVs)	<p>Pilot public rideshare with TNCs using transit worker union drivers.</p> <p>Incentivize cleaner vehicles for TNCs, attaching responsible employer policies to subsidies.</p> <p>Use inclusive procurement policies, as in the U.S. Employment Plan (USEP, see below), in all transit agency partnerships with TNCs.</p> <p>Incorporate worker protections and labor standards in comprehensive regulations of TNCs that also address congestion and vehicle miles traveled (VMTs), e.g., through licensing or rules and fees on access to curb space and public streets.[MJ13]</p>
	Accelerate implementation of San Diego Regional Bicycle Plan and develop pedestrian safety plan	Implement a community workforce agreement (CWA) for all active transportation infrastructure in the County.
	Broadband and communications infrastructure	Condition permits for broadband and communication expansion on universal access and the use of a “skilled and trained” workforce.
	Pricing structures to incentivize HOVs	N/A
	Pedestrian-oriented design	N/A
	Mobility Hubs with shared vehicles	N/A

LANDS		
Carbon Removal & Storage	Prevent land use change to maintain natural sequestration	N/A
	Increase urban tree canopy	Expand public sector employment for these activities or incorporate job quality standards and job access agreements into contract requirements for this work.
Carbon Stock Preservation	Restoration and reforestation, where appropriate	Expand public sector employment for these activities or incorporate job quality standards and job access agreements into contract requirements for this work.
	Protect and restore wetlands	Expand public sector employment for these activities or incorporate job quality standards and job access agreements into contract requirements for this work.
	Carbon farming in agriculture	Condition financial support on sites that have health and safety plans that account for the hazards of climate change on workers' well-being.
	Infrastructure hardening for wildfire resilience	Undergrounding power lines creates infrastructure work opportunities for trades impacted by more limited gas system expansions.

1 Introduction

This report builds upon California’s significant efforts to identify specific policy tools and investments to support workers as the state transitions to a carbon-neutral economy. It is based on the analysis in “Putting California on the High Road: A Jobs and Action Plan for 2030,” prepared by the UC Berkeley Center for Labor Research and Education and as well as sectoral and regional climate jobs analyses conducted by Inclusive Economics.^{12, 13} This High-Road Plan lays out recommendations for incorporating economic and workforce development into major climate policies and maximizing the positive labor market outcomes of public climate investments. It uses successful examples from the workforce policy arena to show that these dual goals can be complementary. Ambitious climate policy can be a catalyst for advancing equity and mobility for workers, while delivering skills and competitiveness for employers.

As California’s official introduction of the High-Road Plan states, the key principles of this approach are:

- Labor should be considered an investment rather than a cost – and investments in growing, diversifying, and upskilling the workforce can positively affect returns on climate mitigation efforts. In other words, well-trained workers are key to delivering emissions reductions and achieving climate targets.
- In a transition to a carbon-neutral economy, deliberate policy interventions are necessary in order to advance job quality and broaden access into good jobs for workers from disadvantaged communities. Government plays a role in promoting social equity and shared prosperity, just as it plays a role in reducing pollution, protecting human and environmental health, and safeguarding communities from an already-changing climate.
- Supporting workers must go way beyond providing funding for training individual workers. It requires a more systemic approach: ensuring that climate investments, mandates and other interventions support high-road employers, often by incorporating labor standards. Only then, and in collaboration with industry, can preparing and training workers lead to positive long-term outcomes in terms of family-supporting careers.¹⁴

Herein, our aim is to apply these principles to the context of the San Diego region’s ambitious decarbonization targets, providing policymakers with high-road workforce tools to pair with their climate policy. Working from the emissions reduction strategies and job impacts identified in the San Diego Regional Decarbonization Framework (RDF), we have identified interventions and initiatives to support job quality and job access in the emerging low-carbon regional economy.

¹² Carol Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

¹³ “Net Employment Benefits of Deep Decarbonization in Colorado: Regional, Sectoral, and Occupational Analysis and Recommendations for Quality Jobs and Economic Inclusion” (December 6, 2021); “Net Employment Benefits of Deep Decarbonization in Nevada: Regional, Sectoral, and Occupational Analysis and Recommendations for Quality Jobs and Economic Inclusion” (December 6, 2021); “Net Employment Benefits of Deep Decarbonization in New Mexico: Regional, Sectoral, and Occupational Analysis and Recommendations for Quality Jobs and Economic Inclusion” (December 6, 2021); “Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities” (June 15, 2021); “Prevailing Wage in Solar Can Deliver Good Jobs While Keeping Growth on Track” (November 12, 2020); “Creating a More Resilient America: Social Infrastructure’s Role in Responding to the Climate Crisis” (October 2020); “California Building Decarbonization: Workforce Needs and Recommendations” (November 14, 2019); “District Energy Decarbonization: Addendum to Report” (November 14, 2019); “How to Achieve Economic Justice in Illinois Clean Energy Transition” (March 4, 2019); “The Net Economic Impacts of California’s Major Climate Programs in the Inland Empire” (August 3, 2017), <https://inclusiveecon.com/portfolio/>.

¹⁴ Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

Demand-Side and Supply-Side Workforce Policy Levers

As the High-Road Plan details, a coherent high-road workforce strategy addresses both workforce *demand* and *supply*. Demand-side levers *pull* workers into jobs and influence the quality of those jobs and the skills that workers need to have, while supply policies and programs *prepare* workers for the jobs created. Training is a necessary but insufficient strategy to address the decarbonization transition because weak demand for workers, through too few jobs, narrow skill requirements, low wages, or poor working conditions can lead to low placement rates and lack of career opportunities, and wasted investments in training. At the same time, insufficient investments in training means that employers' needs for adequately trained workers will go unmet. While climate investments could create a lot of jobs, ensuring job quality is critical for attracting and retaining skilled workers and reaping the returns on investments in training.

Demand-side policy levers encourage improvements in *job quality* (better wages and benefits, career ladders, etc.), supporting a more skilled workforce, which in turn leads to improvements in *work quality*, i.e., better design, installation, operation, and maintenance of technologies.¹⁵ Demand-side policy levers can drive the growth that creates jobs in emerging sectors, and they support the high-road employers within an industry, establishing an alternative to “lowest bid” market dynamics that fail to factor in job quality, work quality, and investment in workers.

Demand-side policies also include mechanisms to avoid and remove barriers and increase economic opportunity for workers from disadvantaged and historically excluded communities. Demand-side levers can be incorporated into a decarbonization framework through policy, regulatory action, and program design. Local authorities and agencies responsible for implementing climate investments play a key role here.

Supply-side policy levers focus on preparing the workforce for the changing job landscape throughout the transition to a carbon-neutral economy. This involves developing, upgrading, and offering training and skill-building in step with changing technologies and demand in the market. Supply-side levers include targeting programs and support services toward people from disadvantaged or historically marginalized communities to ensure more equitable access to career-track jobs and economic opportunity.

Supply-side levers are deployed within the workforce development community, i.e., the interconnected network of adult education and training services and institutions including the community college and four-year college systems, certified apprenticeship programs, pre-apprenticeship programs, nonprofit training organizations, labor-management partnerships, public workforce development agencies, and other partners at the state, county and municipal levels. Training and education are an investment which is valuable to workers if they lead to secure employment and career advancement, and valuable to employers if they lead to higher-quality work and greater productivity.¹⁶

Funding for these education and training programs comes from a variety of sources, including state and federal sources. For public funding to be effective in securing high-road outcomes, workers need to be not just trained, but actually hired and retained in high-quality employment. This is why public training

¹⁵ Carol Zabin et al., “California Workforce Education & Training Needs Assessment for Energy Efficiency, Distributed Generation, and Demand Response” (UC Berkeley Donald Vial Center on Employment in the Green Economy, March 2011), <http://laborcenter.berkeley.edu/california-workforce-education-and-training-needs-assessment-for-energy-efficiency-distributed-generation-and-demand-response/>.

¹⁶ Zeynep Ton, *The Good Jobs Strategy: How the Smartest Companies Invest in Employees to Lower Costs and Boost Profits* (Boston, MA: New Harvest, 2013).

investments should be targeted toward high-road employers who see the skill development of their workforce as an important investment.¹⁷

Calibration between demand and supply is key so that there is a realistic chance for graduates to be placed in a job. Apprenticeship programs and labor-management training partnerships support the calibration between demand and supply—working closely with employers to train workers with industry-recognized skills for actual job openings, and matching new openings in the apprenticeship programs to the number of jobs that exist.

Workforce development is essential to building economic opportunity for those who have been marginalized, disadvantaged, and otherwise denied opportunities. Programs targeted to disadvantaged workers can secure more equality in the distribution of job opportunities, but the shortage of good jobs is an ongoing challenge for these pipeline programs. As the High-Road Plan underscores, “To improve outcomes for workers in low-wage jobs, the most effective strategies are those that build skills, respond to employer needs, and improve job quality, simultaneously.”

A Focus on Blue-Collar and Construction Work

Two findings in particular shape our analysis and workforce recommendations: 1) the predominance of blue-collar work in the sectors concerned; and 2) the importance of the construction industry in the sectors concerned, particularly in energy and transportation, but also in building decarbonization and land use.

Blue-collar occupations are defined here, based on the Bureau of Labor Statistics standard occupational codes (SOC) as: construction and extraction occupations; production occupations; transportation and material moving occupations; installation, maintenance, and repair occupations; building and grounds cleaning and maintenance occupations; and farming, fishing, and forestry occupations.

As articulated in the state High-Road Plan:¹⁸

The term blue-collar does not mean low-skilled; many blue-collar workers must gain skills to carry out their jobs, and they increasingly perform technical and computer-related tasks.¹⁹ The predominance of these occupations among the industries affected by climate policy does highlight the importance of workplace-based training and industry partnerships, since many of these workers are not required to have post-secondary education.^{20, 21}

The predominance of blue-collar occupations in climate policy implementation also highlights the need for particular attention to job quality. The quality of blue-collar jobs varies tremendously, even within the same industry, depending on the degree of subcontracting and outsourcing, degree and ease of

¹⁷ Laura Dresser, Hannah Halbert, and Stephen Herzenberg, “High Road WIOA: Building Higher Job Quality into Workforce Development” (Economic Analysis Research Network (EARN), COWS, Policy Matters Ohio, Keystone Research Center, December 2015), https://www.keystoneresearch.org/sites/default/files/KRC_WIOA.pdf.

¹⁸ Excerpted from Chapter 5. Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

¹⁹ Sarah White and Jason Walsh, “Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy” (Center on Wisconsin Strategies (COWS), The Workforce Alliance, and The Apollo Alliance, March 12, 2008), <https://www.cows.org/greener-pathways-jobs-and-workforce-development-in-the-clean-energy-economy>.

²⁰ U.S. Department of Labor, Bureau of Labor Statistics, “Occupational Outlook Handbook,” accessed January 11, 2022, <https://www.bls.gov/ooh/home.htm>.

²¹ Joel Rogers et al., “High Performance Partnerships: Winning Solutions for Employers and Workers” (State of Wisconsin Department of Workforce Development, 1999), <https://www.cows.org/high-performance-partnerships-winning-solutions-for-employers-and-workers>.

employment law enforcement, unionization rates, and other factors.²² These differences in job quality within industries and between high- and low-road employers are often difficult to discern from government data, which also is not able to capture wage theft and other employment violations.^{23, 24}

White-collar or professional occupations, defined here as engineering, scientific research and development, and other specialized occupations (e.g., lawyers and accountants) that require a college degree or professional license, are also critical for the design, planning, and administration of emissions-reducing policies and programs. Jobs requiring a college degree generally pay family-supporting wages and provide workers with a return on their investment in education.²⁵ These occupations can provide important career mobility paths for workers from disadvantaged communities, but they are much more limited in number than blue-collar jobs and the barriers to entry are greater.

For all of these reasons, a successful strategy to support positive workforce outcomes will focus on blue-collar occupations, as the area where policy intervention is most needed and the area supporting the highest number of jobs. [Appendix A](#) contains data on occupational distribution and the percentages of blue-collar workers in the industries involved in or affected by decarbonization.

Transition Strategies for Fossil Fuel Workers

Any job loss associated with the transition to a carbon-neutral economy must be addressed to ensure that workers do not fall through the cracks. “Just transition” refers to integrated policy approaches set up to provide protection, support, and compensation for displaced workers and communities in specific industries or regions. Of course, the goal of a truly just transition is to minimize or eliminate the need for worker transition assistance. This goal can be accomplished by aligning capital investments with projects that utilize the same occupations as an industry in decline, and engaging in long-term planning that aligns a shrinking workforce with worker retirements.

Just transition needs can include both immediate short-term assistance to workers and communities directly affected by industry decline due to climate change or climate policy, and long-term assistance to communities and workers as they “retool” and adapt to a carbon-neutral economy, if smooth redeployment is not possible for all displaced workers.²⁶ Measures to support workers can include retraining opportunities, wage guarantees, bridges to retirement, retraining support, and relocation support. For communities or regions, just transition strategies can incorporate economic development planning, to help better identify the most promising emerging new industries based on regional assets including geography, educational and research institutions, and existing workforce skills. The first steps toward ensuring a just transition is convening a task force to define the most likely job loss scenarios in the region and coordinate concrete short- and long-term actions.

²² Sara Hinkley, “Structurally Adjusting: Narratives of Fiscal Crisis in Four US Cities,” *Urban Studies* 54, no. 9 (July 2017): 2123–38, <https://doi.org/10.1177/0042098015618167>

²³ Ruth Milkman, Ana Luz Gonzalez, and Victor Narro, “Wage Theft and Workplace Violations in Los Angeles: The Failure of Employment and Labor Law for Low-Wage Workers” (UCLA Institute for Research on Labor and Employment, 2010), <https://escholarship.org/uc/item/5jt7n9gx>.

²⁴ Annette Bernhardt, “Labor Standards and the Reorganization of Work: Gaps in Data and Research,” IRLE Working Paper (UC Berkeley Institute for Research on Labor and Employment, January 2014), <https://escholarship.org/uc/item/3hc6t3d5>.

²⁵ David Autor, “The Polarization of Job Opportunities in the U.S. Labor Market: Implications for Employment and Earnings” (Center for American Progress and The Hamilton Project, April 2010), <https://economics.mit.edu/files/5554>.

²⁶ Elena Foshay, Jill Kubit, and Lara Skinner, “Making the Transition: Helping Workers and Communities Retool for the Clean Energy Economy” (Apollo Alliance & Cornell University, ILR School Global Labor Institute, 2009), http://www.climatechange.ca.gov/eaac/comments/2009-12-11_California_Labor_Federation_attachment_2.pdf.

In the San Diego region, there is time to develop a just transition plan. Researchers analyzing the employment impacts of the RDF do not project job loss due to climate action up to the year 2030; however, from 2031 to 2050, employment in the County's fossil gas sectors is expected to contract -75%, as demand for gas declines.²⁷ These employment impacts will be driven by the speed of the transition away from gas. If electrification of new and existing buildings is faster than modeled, driven by climate concerns, policy design, or economics, workers currently involved in fossil gas distribution could see reduced work earlier than 2030.

Analysis conducted by Inclusive Economics for the City of San Diego (pending publication) details this potential job loss. Other areas in which there is risk of negative job impacts include gas-powered electricity generation and fueling and maintenance of internal combustion engine (ICE) vehicles (which require more labor than electric vehicles). The challenge of addressing this job loss is great but not insurmountable. Working in the region's favor is the fact that it does not have a fossil fuel extraction and refining activity to reckon with, already has a diverse economy, and that the delayed impacts give the County time to prepare. Moving forward proactively, the region should be able to ensure a just transition for affected workers.

San Diego Context

This report has been prepared as a companion paper to San Diego's Regional Decarbonization Framework (RDF),²⁸ an in-depth study laying out a "science-based approach to help governments in the San Diego region plan for policies and investments to achieve emissions reductions consistent with [the] state target" of net zero carbon emissions by 2045 (California Executive Order B-55-18).²⁹ San Diego County has chosen to create this RDF in support of its Climate Action Plan (2018 CAP),³⁰ which is currently being updated, with the new final version expected in 2024. Specifically, our report looks at areas of the San Diego region's economy that the RDF researchers have identified as being impacted by decarbonization.

Our analysis builds on both the jobs analysis in the RDF³¹, the four sector chapters, and the local policies chapter that together identify specific strategies and policies to reduce greenhouse gas emissions in buildings, energy, transportation, and lands. We use this research to offer additional insight into workforce issues and make policy and investment recommendations to support job quality and job access for workers as the region transitions to a low-carbon economy.

The RDF analysis of employment impacts focuses primarily on the "central case" modeled for the period up to 2030. The jobs figures provided in Chapter 6 of the RDF are estimated on the basis of energy demand expenditures and investments in energy production. They reflect the overall employment impacts of the decarbonization strategy modeled as the central case in Evolved Energy's model. This central case models the least-cost pathway to decarbonization of San Diego's energy supply and demand, *rather than* the actual policies that have been or can be legislated to achieve decarbonization. These job estimates therefore should be used to understand the scale of impact rather than its specific timeline.

²⁷ Pollin et al., Chapter 6: Employment Impacts through Decarbonization for the San Diego Region in "San Diego Regional Decarbonization Framework."

²⁸ "San Diego Regional Decarbonization Framework."

²⁹ Edmund G. Brown, Jr., "Executive Order B-55-18 to Achieve Carbon Neutrality," Pub. L. No. EO B-55-18 (2018), <https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf>.

³⁰ "County of San Diego Climate Action Plan (2018 CAP)" (County of San Diego, February 2018), <https://www.sandiegocounty.gov/content/dam/sdc/pds/advance/cap/publicreviewdocuments/PostBOSDocs/San%20Diego%20County%20Final%20CAP.pdf>.

³¹ Pollin et al., Chapter 6 in "San Diego Regional Decarbonization Framework."

Likewise, the job impact estimates from the RDF should *not* be used for workforce development planning, which must be based on much finer-grained analysis of labor demand and development of industry training partnerships in collaboration with employers and unions in affected industries. The sector chapters offer insight as to which employers will be impacted and combine this information with the research previously published in the state High-Road Plan.

The RDF job impact analysis reassures us that decarbonization will generate a net positive number of jobs. It also identifies broad industries and occupations affected, underscoring the predominance of blue-collar occupations in the construction industry, as well as possible low-wage trouble spots that require specific interventions to avoid perpetuation or exacerbation of low-wage job trends. Like the State High-Road Plan, the RDF analysis shows potential for low-wage jobs in the major blue-collar occupational categories of production, construction, transportation, and installation and maintenance in key activities that will be impacted by climate policy (see Tables 10 and 11 in Chapter 6 of the RDF).

The aim of this report is to lay out the ways in which decarbonization policies can be designed or adapted to support workers and good jobs. We also note when solutions not accentuated in the least-cost pathway merit additional attention because of their specific attributes that can support the region's workers.

To understand the impact of decarbonization on job quality and job access, and the opportunities to improve outcomes for workers, we must turn to the sector and local policies chapters in the RDF, which lay out the policy options for each of the four sectors targeted for climate action as laid out in the decarbonization framework: Buildings, Energy, Transportation, and Land Use. We highlight the complementary labor policies and capital investments that can be incorporated to ensure that climate action results in family-supporting jobs and inclusive pathways into these good jobs. We also identify areas where there is the potential for job loss and identify policies to make workers whole.

Finally, in terms of the phasing of our recommendations, with different, sometimes overlapping, legal instruments, frameworks, and jurisdictions come different timelines for climate actions. Here, as in the RDF, two phases are considered in the San Diego region's decarbonization: the period up to 2030, which is the date fixed by California Executive Order B-30-15³² for the interim goal of reducing greenhouse gas emissions to 40 percent below 1990 levels; and the period from 2031 to 2050, which is the forecast date modeled by the RDF researchers for a fully decarbonized economy. For our purposes here, i.e., workforce recommendations, our treatment of these two phases can be summed up as follows: all labor standards and actions affecting job quality and access in job markets that will persist or grow are the same for both periods, 2021–2030 and 2031–2050. This is because actions to address job quality and job access must be initiated immediately and sustained throughout the entire period. In terms of capital investments and piloting new infrastructure solutions to climate change, we recommend beginning immediately so that promising solutions can be appropriately scaled by 2050.

Actions to address job loss will apply primarily to the second period (2031–2050) because, according to RDF estimates, any job loss before 2030 is likely to be minimal and entirely offset due to naturally occurring retirements. The RDF provides rough estimates of employment contraction in the longer term (2031–2050). However, these projections do not tell us how the effects of decarbonization will play out “in the field” over several decades. How industries, businesses, and workers will respond to the changing economy in the longer term (up to 2050 and beyond) is difficult to predict: even the most sophisticated analysis of the best available data would require significant guesswork. While we cannot know exactly when, how many, and

³² Edmund G. Brown, Jr., California Executive Order B-30-15 to Achieve Carbon Neutrality.

which jobs will shift as the economy phases out carbon-intensive sectors, we do know how to support the creation of good jobs, and how to calibrate with labor and industry to ensure a healthy balance of skilled workforce supply and demand. Astute use of high-road levers on both sides, supply and demand, coupled with just transition measures for workers facing job loss will ensure the best possible outcomes for workers.

2 Demand-Side Strategies and Tools

[Appendix B](#) covers a broader discussion of each of these tools and how they work. It also includes information relevant to implementation in the San Diego region, and both local and non-local examples of these tools in practice.

1. Expand the use of Community Workforce Agreements (Project Labor Agreements with Local and/or Targeted Hire) on climate investments involving large-scale construction projects. (Construction)

Community workforce agreements (CWAs), as we use this term, are project labor agreements (PLAs) between construction employers and one or more unions that set wages and benefits, specify the use of apprentices, and include hiring language to promote the inclusion of local workers and or/worker from historically marginalized groups. CWAs have a proven track record of ensuring job quality and job access in construction, a critical industry for many sectors in the RDF.

Agencies or entities administering public or ratepayer funds for low-carbon infrastructure can use CWAs on large projects for infrastructure investment in renewable energy, energy efficiency retrofits, EV charging infrastructure and transit infrastructure projects, installation of emission controls in refineries, leakage abatement in oil and gas distribution, and waste and water infrastructure. The typical minimum threshold for stand-alone CWAs is \$1 million in contract value, because sufficient scale is necessary to create enough jobs to successfully implement targeted hire requirements.

In climate policy, CWAs are currently used in utility-scale renewables construction, light rail, and high-speed rail construction, and other large-scale construction projects. See examples and information on the local context for PLA and CWA implementation in [Appendix B](#).

2. Use inclusive procurement policies for public procurement of large capital equipment, contracts for public services, and in grant programs (for industries other than construction).

Inclusive procurement policies by state, county, and municipal government entities require businesses that contract with public entities to comply with high labor standards, such as family-supporting wages, skill standards, investments in training, and inclusive hiring.

Agencies or entities administering climate investment funds can use inclusive procurement policies to incorporate anticipated workforce outcomes in the criteria they use to rank bidders in competitive solicitations. Awarding agencies can insert this language in solicitations for the procurement of large capital equipment like buses, for contracts for public services like waste collection and fire prevention, and in grant programs.

LA Metro has successfully used inclusive procurement language (applying the [U.S. Employment Plan](#), USEP) to ensure family-supporting jobs, substantial investments in training, and commitments to hiring veterans, women, and formerly incarcerated workers in a manufacturing facility that is providing zero-emission buses to the agency (See discussion of the [USEP](#) inclusive and responsible procurement process in the Transportation chapter, and in [Appendix B](#)).

3. Include responsible employer standards in all climate-related incentive programs (all industries).

Responsible employer standards for publicly-funded incentive programs, including rebates, loan assistance, and other financial support, are a powerful tool to ensure adequate work quality and to avoid using public funds to support poverty-level jobs or the underground economy. Because incentive programs only partially subsidize private investments, the comprehensive strategies described in the first two recommendations above are not generally feasible. Responsible employer standards can be implemented by pre-qualifying contractors eligible to participate in rebate and incentive programs. For example, firms seeking pre-qualification must certify that they have:³³

- (1) All business, trade and professional licenses, registration or certificates required by law;
- (2) All bonding and insurance required by applicable law or contract specifications;
- (3) An acceptable past performance record showing it has not been debarred or defaulted by any government agency and has not had any license revoked in the past three years;
- (4) A clean record on law compliance -- no major violations of any laws (91,000 or above) relating to the contracting industry, including tax laws, licensing laws, wage laws;
- (5) For construction projects, a state-registered apprenticeship training program for craft workers that has graduated apprentices for at least three years); and
- (6) All other technical qualifications, equipment, financial resources and personnel needed to successfully perform the project.

3a. Use skill standards in incentive programs to ensure safe and proper performance in the installation, operation, and/or maintenance of low-carbon measures.

For emerging technologies, incumbent worker upgrade certifications can be incorporated into program requirements for rebates, incentives, loan assistance, and more. For commercial and industrial construction, agencies can employ the “skilled and trained workforce” standard currently required in some public works and in refinery upgrade work, which utilizes enrollees and graduates of state-certified apprenticeship programs.

For advanced technologies, use specialized skill certifications like CALCTP or the [Electric Vehicle Infrastructure Training Program](#) (EVITP). These skill certifications are critical because persistent quality or safety problems have emerged in the installation, operation, and maintenance of some key technologies that are critical to lowering emissions, including HVAC, advanced lighting controls, EV-charging stations, and battery storage.

Agencies administering programs can consult with subject matter experts, the California Workforce Development Board (CWDB), community colleges, the Division of Apprenticeship Standards, and high-road employers to help identify the most appropriate advanced certifications.

³³ Gerard M. Waites, Esq., “Responsible Contractor Reforms, Ordinances, and Policies: Executive Briefing Paper,” April 2011, O’Donoghue & O’Donoghue, LLC, Washington, DC.

3b. Use living wage standards and verification of compliance with all employment and labor law, including health and safety standards, in incentive program requirements.

For industries characterized by low wages, health and safety violations, and other indicators of low-road conditions, living wage standards and verification of compliance with the full range of California labor, employment, and environmental regulations can be incorporated into program requirements for rebates, incentives, loan assistance, and other assistance.

Without such requirements, incentives in these industries could end up supporting employers with low-road labor and workforce practices. Sectors in which violations are common include residential construction, trucking, forest and wildlands management, agriculture, some manufacturing, and subcontracted waste and water services. Agencies implementing climate measures in these sectors can use responsible employer policies to ensure that public funds do not support poverty-level jobs or violations of state labor and employment law.

4. Use public-sector insourcing or exclusive franchise contracting models to support labor and environmental standards for public services and some incentive and low-income programs.

State and local jurisdictions and other public entities can use their own employees instead of subcontracting, or use exclusive franchise systems for services that are currently “open market.” Subcontracting in some weatherization programs has led to low wages and lack of career ladders for workers. Open markets in waste, where customers contract with private waste providers, have impeded enforcement of state waste-diversion mandates and produced low-road labor practices.

In an exclusive franchise system, local governments set contract terms and conditions, and can more easily enforce environmental and labor standards. The City of Los Angeles adopted the exclusive franchising model for its waste system. The LADWP insourced its weatherization program that had been previously subcontracted, allowing the creation of career ladders for entry-level weatherization workers into permanent jobs in the utility.

5. Use metrics to measure the impact of climate policies on job numbers, job quality, and job access.

Tracking and reporting on the job impacts of climate policy is necessary to measure progress over time. The CARB is currently developing methods and metrics for tracking job numbers, job quality, and job access. Local jurisdictions commonly use commercial software (such as LCPTTracker, Elation Systems, or eMars³⁴) for certified payroll records to track compliance with prevailing wage and local/targeted hire rules (while maintaining confidentiality of worker information). Agencies can use the data collected via electronic certified payroll reports to assess job quality and job access across a wide variety of climate programs. Tracking job metrics in other industries or in sectors not required to submit certified payroll will be more challenging. The County can access QCEW data to understand more general employment trends in the region, or model impacts based on changes in industry spending.

6. Provide technical assistance to agencies implementing climate policy on how and when to apply these demand-side workforce interventions.

³⁴ LCPTTracker is used, for example, by LA Metro to track the labor outcomes of its Project Labor Agreement (PLA) and Construction Careers Policy. See <https://www.metro.net/about/placcp/>.

The California Workforce Development Board (CWDB) has a small technical assistance team to help agencies responsible for implementing climate policy as they seek to incorporate high road workforce interventions. Agencies administering climate investments and policies have limited experience and training to assess when, where, and how to incorporate the tools and approaches outlined in this report. There is considerable expertise within the CWDB and among their university and NGO partners, on community workforce agreements, responsible contractor language, and other demand-side interventions, which can be called upon to assist agency staff on how and when to implement these recommendations. San Diego should work with the CWDB to develop its own capacity to identify appropriate labor standards in their RDF implementation measures, perhaps through a regional body that can take responsibility for this function for all the local authorities in the region.

7. Identify and focus investments on win-win strategies that meet both climate and workforce goals.

This could include targeted investments such as for carbon-free district energy systems, neighborhood-scale geothermal loops, waste-to-energy biomethane pilots, or green hydrogen demonstrations. It could also include consolidating and targeting incentives to achieve decarbonization in schools, affordable housing, or County facilities, using skilled and trained workers. Public charging and fueling infrastructure for electric and alternative fuel cars is another centralized investment that can create good jobs and accessible pathways to those jobs.

3 Supply-Side Strategies and Tools

[Appendix C](#) covers a broader discussion of each of these tools and how they work. It also includes more local and non-local examples of these tools in practice.

- 1. Support comprehensive training that prepares workers for careers, rather than niche programs that train on one particular “green” skill or “green” technology.**

This often means adding green components to vocational training, such as incorporating energy efficiency education into architecture programs, incorporating EV technology into auto mechanic training programs, and incorporating battery storage into electrical certification training. This is in contrast to short term training programs for solar installers, which have not shown strong outcomes for workers.

- 2. Leverage existing training infrastructure and align with state high road training initiatives, H RTP and HRCC.**

For construction, this means support for state-certified apprenticeship, and where needed, journey upgrade modules to address specific emerging technologies. For other industries, this means support for or development of high road industry training partnerships or apprenticeship programs (which are one form of H RTPs), as described above, in the activities that are described in the sector chapters. Apprenticeship programs are in development in the manufacturing of low-emission buses as well as in transit operations and vehicle repair and maintenance. New opportunities that could be developed in the San Diego region include for example, in the lands sector, public agencies and their unions can develop training programs for wetlands restoration or other activities to increase the carbon sink of natural lands.

- 3. Support industry recognized skill certifications.**

These can be focused on a particular technology if they are built as skills upgrade modules on top of foundational credentials. For example, the [Electric Vehicle Infrastructure Training Program](#) (EVITP) requires trainees to be certified electricians before receiving EVITP certifications. It has been incorporated into the state-certified apprenticeship and journey upgrade program jointly administered by the National Electrical Contractors Association and the International Brotherhood of Electrical Workers.

- 4. Focus inclusion programs where industry training partnerships exist or can be created, to ensure that training for workers from disadvantaged communities is more likely to lead to placement in career track jobs with family-sustaining wages and benefits.**

For construction, these are pre-apprenticeship programs, for which there exists state-funding and best practice guidelines. For non-construction industries, existing or developing H RTPs hold the most promise for successful inclusion. The H RTP for transit workers, which San Diego is planning to join, provides an example of a successful program that provides a career pathway for workers without a college degree.

- 5. Support curriculum upgrades and instructor training to keep up with emerging technologies in priority climate occupations.**

To prepare the next generation of energy engineers, electricians, zero-emission bus mechanics, transportation planners, and all the other occupations that will be critical in designing, planning, building, operating, and maintaining new technologies that lower GHG emissions, the San Diego region should support the incorporation of new relevant skills and knowledge in the existing key institutions that provide

foundational training for priority occupations. This means helping these apprenticeship programs, community colleges, and four-year colleges invest in relevant curriculum upgrades and professional development for their instructors.

6. Use metrics to track outcomes of all training programs.

To evaluate and improve training investments over time, all training programs should track workforce outcomes for participants in publicly funded training programs. Key metrics include not only number of enrollees and number of graduates, but also attainment of industry-recognized credential, job placement, job retention, initial wages and wage mobility over time.

7. Support inclusion programs for white collar/technical clean energy jobs.

A commitment to broaden access to economic opportunities that emerge from the growth of low-carbon sectors should also focus on inclusion into jobs that require bachelor's or graduate degrees, such as engineers, architects, and other professional and technical workers. For these jobs, inclusion efforts are most successful when linked to preparation in high school, as it is much more difficult to create such pathways after workers leave school. The California Partnership Academies, the California Linked Learning Initiative, and the California Career Pathways Trust all are recent initiatives, designed to build successful high-school-to-college transitions for California's many underserved youth, which can eventually lead into critical occupations related to climate policy implementation. The community college system, via its transfer programs, is itself a pipeline for many disadvantaged Californians into professional occupations.³⁵

The following sections discuss opportunities for high-quality job creation in the four key sectors involved in San Diego's regional decarbonization: Building Decarbonization, Energy, Transportation and Lands. To make sure policies result in not just jobs but high-road jobs, all of the public assistance to realize these economic opportunities can incorporate the labor policy levers identified in this report. Government assistance (incentives, grants, etc.) will help drive a lot of the changes needed to massively reduce GHG emissions. Incorporating labor standards wherever public resources are being tapped has an enormous positive impact on outcomes for workers.

³⁵ Carol Zabin et al., "Workforce Issues and Energy Efficiency Programs: A Plan for California's Utilities (WE&T Guidance Plan)" (UC Berkeley Donald Vial Center on Employment in the Green Economy, May 2014), <http://laborcenter.berkeley.edu/workforce-issues-and-energy-efficiency-programs-a-plan-for-californias-utilities/>.

4 Building Decarbonization

Overview of the Sector

On-site fossil fuel combustion is the main source of GHG emissions from buildings and accounted for around 9% of total emissions in the San Diego region in 2014 (RDF, Chapter 5). These direct emissions from buildings (and not emissions from electricity generation, addressed in the energy chapter in the RDF) are the target of the region’s decarbonization efforts in this sector.

With advances in electric technologies such as heat pumps for heating and cooling, water heating, and clothes drying, and induction stoves, electricity has become the predominant alternative to using fossil fuels in buildings. Electricity is increasingly able to cover all the energy needs of homes and buildings cost effectively and efficiently. As electricity gets even, building electrification will put that clean electricity to use lowering greenhouse gas emissions in buildings.

In terms of other low-emissions alternatives to fossil fuels, the RDF briefly explores the option of low-carbon gaseous fuels like biomethane and hydrogen, but identifies cost and efficiency issues that put these fuels at a competitive disadvantage in the San Diego context (RDF, Section 5.2.), compared to electric technologies.

To achieve the building decarbonization needed to eliminate emissions by 2045, high electrification is the basis of the Central Scenario developed in the RDF. With this pathway, “95 percent of space heating and water heating equipment sales are fully electric by 2030 and 2032, respectively. In 2050, no residential water heating is served by gas and only 8 percent of residential space heating systems are unelectrified.”³⁶ With this scenario, traditional pipeline gas would decline to almost null by 2050.³⁷

The RDF identifies the need to minimize unnecessary extensions and replacements of the gas distribution system and suggests targeted geographic gas system retirements. There will be significant changes to the county’s gas utility business no matter which decarbonization pathway is pursued, as the amount of natural gas sold will decrease sharply in any case.

It can also be argued that, to some extent, the job impacts of building decarbonization in the San Diego region are to be expected and need to be prepared for, regardless of county policy: rising energy prices, declining gas use in the region, and state legislation to address climate change, are all factors that are already changing building energy-use and construction practices. Proposed updates to the State of California’s Title 24 Energy Code, for instance, will strongly encourage (though not mandate) all-electric new construction beginning in 2023, spurring changes in the construction industry across the state.

The following analysis focuses on ensuring the quality of building electrification jobs, and on the natural gas workers at the frontline of this transition, examining the workforce issues involved and steps that can be taken to mitigate negative impacts.

³⁶ “San Diego Regional Decarbonization Framework.”

³⁷ “San Diego Regional Decarbonization Framework.”

Climate Policy for the Buildings Sector

As reported in the RDF, “Space heating and water heating are the two [building] end uses responsible for the most greenhouse gases in San Diego County... in part because they require large amounts of energy... and in part because they rely heavily on fossil fuels, specifically natural gas.”

The City of San Diego and the unincorporated areas of the county make up 57% of the county’s residential buildings and almost 60%³⁸ of its commercial buildings. This means that in terms of jurisdiction, the City and County together have the opportunity to significantly reduce emissions in this sector with targeted policies such as building energy codes (RDF, Ch. 5). As we will discuss below, tying labor standards to such codes is also a major opportunity to support job quality.

The City of San Diego has already proposed two key building decarbonization policies that appear compatible with the County’s climate goals: its Municipal Energy Implementation Plan to upgrade all municipal facilities to achieve zero carbon emissions by 2035; and a “Reach Code” that would require all new construction to be all-electric, i.e., to use electricity instead of natural gas for all end uses (heating, cooling, hot water, and cooking).³⁹

The RDF makes a strong case for a high-electrification pathway to building decarbonization across the San Diego region. As we discuss in this section, there are a number of levers that county policymakers can use to create good jobs and avoid job loss.

Workforce Issues in Building Decarbonization

Over time, increasing electrification in the building sector will affect jobs, resulting in less demand for gas piping installation and repairs both inside of and to buildings, as well as less throughput of the fuel itself.

There are three main categories of jobs in the County’s gas industry:

- Gas utility jobs: Employed directly by the local utility (SDG&E). Includes pipe trades, operations and maintenance workers, general construction laborers, management jobs, service and sales occupations, and others.
- Gas infrastructure jobs: All other jobs in the maintenance and expansion of natural gas infrastructure. Includes jobs contracted out by SDG&E for pipefitting, trenching, and excavation work.
- Gas plumbing and appliance jobs: Jobs associated with gas piping, appliance installation, maintenance, and repair inside of buildings.

Of these, the second category of workers is most at risk in the San Diego region, as the gas industry contracts. Because SDG&E is a dual fuel utility, employees on the shrinking gas side of the business can over time and with planning be absorbed into the expanding electrical side of the utility. And while buildings without gas will require less plumbing, plumbing jobs won’t be eliminated altogether. If construction and

³⁸ Derived from Figure 5.6. and county total in Chapter 5 of the “San Diego Regional Decarbonization Framework.” Calculated as: San Diego (290 million sq. ft.) + Unincorporated (40 million sq. ft.) = 330 million sq. ft.= 59.5% of total square footage of commercial buildings in the county (554 million).

³⁹ “DRAFT: City of San Diego Municipal Energy Strategy” (City of San Diego | San Diego Sustainability Department, n.d.), https://www.sandiego.gov/sites/default/files/draft_municipal_energy_strategy_final_0.pdf.

retrofit work expands, there will be more, not less, jobs for plumbers and these workers have important roles to play in water efficiency and reuse.

For gas infrastructure workers most vulnerable to job loss, particular attention should be paid to investments in pilots that can make good use of those skills. This includes waste-to-energy biomethane projects, green hydrogen demonstrations, and carbon-free district energy pilots. For those who are close to retirement or those whose skill set is highly specialized, measures such as bridges to retirement and other safety net measures are covered in Chapter 8 on Just Transition.

Decarbonizing the buildings of the San Diego region will require a combination of requirements and incentives, i.e., “sticks and carrots,” which we label here as policies and programs. These can be deployed in tandem to create good jobs in key industries. Policies such as regulations, building performance standards, reach codes, time of sale / time of equipment replacement requirements, etc. prompt decarbonization actions by making them mandatory. Programs such as incentive schemes, coordination between different funding sources and partners, pilot programs for innovative approaches, and direct public investments encourage and facilitate desired actions. By pairing requirements with incentives, labor standards can be stipulated, requiring contractors to adopt targeted hire standards, pay prevailing wages, etc.

Pairing policies (requirements) and programs (incentives or direct investment) can be effective strategies for supporting high-road building decarbonization. The following examples illustrate how policies and programs can work together to accelerate climate action and support good jobs.

- Establish rules to make existing buildings “electric ready.” Electric-ready involves electric panel and service upgrades requiring licensed electricians and efficiency investments requiring electricians, plumbers, HVAC and workers, insulators, carpenters, laborers, and other trades. Time of sale or renovations can trigger a requirement. Incentives such as accelerated permitting conditioned on use of a skilled and trained workforce can support job quality.
- Pair gas system pruning with carbon-free district energy, which provides infrastructure-scale solutions to decarbonize space and water heating for entire neighborhoods. District energy systems involve substantial construction and maintenance work to install and operate a network of pressurized underground pipes, drawing on the exact set of knowledge and skills currently used in the gas distribution system. Rules to prune the gas system can be coupled with incentives to support customer transition to new technologies.
- Pilot waste-to-energy biomethane and/or green hydrogen demonstration projects for hard-to-electrify end uses. These technologies are currently cost-prohibitive for widespread application, but they will be necessary for eventual carbon neutrality in the San Diego region. Early experience will answer key questions about their appropriate applications, workforce needs, safety considerations, and other criteria.
- Policies and programs to support higher-density and transit-oriented development will encourage more infill. Requiring developers to build larger and taller 4+ story buildings will draw upon a highly-skilled workforce, providing more opportunities for union journey-level and apprentice workers than low-rise developments do, while achieving other climate goals too (related to transportation emissions).
- To improve building energy performance in non-residential buildings in a way that supports high-road workforce outcomes and community benefits, investments could be made in schools and other public-service sectors such as universities and hospitals. In many of these buildings, repairs and replacement of gas-burning equipment may already be necessary, and there are always cost-effective efficiency opportunities. A cost analysis for the city of Los Angeles found that for a total investment of \$220–370M to decarbonize all K-12 school buildings, \$50–110M would have been needed anyway for

necessary energy repairs and upgrades⁴⁰ Wherever concentrated public investments are made, community workforce agreements (CWAs) can specify labor and wage standards along with targeted and local hire metrics, to ensure that the investments are supporting high-quality jobs and equitable access to them.

- In the residential and small commercial sector, cost tends to dictate the market dynamics, with firms competing in a lowest-bid landscape, which, in turn, can lead to low-wage jobs. Tying electrification incentives to responsible contractor pre-qualification can ensure the high-quality installation by skilled workers. This not only supports high-road jobs but avoids consumer disappointment that can hinder market adoption of new technologies.
- Rigorous inspection and quality assurance processes help level the playing field in the market. It may not be apparent to consumers that paying less for a heat pump installation may mean their equipment is being installed by workers without adequate training. If a poorly installed system fails to deliver the anticipated energy gains and cost savings, consumers may inaccurately think the equipment or technology is to blame. Conditioning incentives on inspections that validate the equipment is installed and operating as designed support the engagement of a qualified workforce.

Disrupting long established market dynamics is not easy, but building decarbonization policies and programs should be designed with job quality concerns in mind, to ensure that public resources are not inadvertently perpetuating low-road dynamics

Key Recommendations for the Building Decarbonization Sector

Demand Side	
Non-Residential Building Decarbonization	<ul style="list-style-type: none"> ❖ Require “skilled and trained” workers are involved in large-scale commercial building decarbonization projects. ❖ Invest in decarbonizing and upgrading the region’s public buildings under a Community Workforce Agreement, to ensure union wage and benefit standards and expand hiring of workers from disadvantaged communities. ❖ Support deep energy efficiency in Municipal, University, School, and Hospital (MUSH) sector buildings with labor standards.
Small Commercial and Residential Building Decarbonization	<ul style="list-style-type: none"> ❖ Support electric-ready buildings by aggregating neighborhoods for electric service upgrades, performed by pre-qualified contractors. ❖ Develop a fund for deep decarbonization of the region’s affordable housing, to support high-road jobs in this sector while reducing energy burdens for low-income renters.

⁴⁰ Betony Jones, “Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities” (Inclusive Economics, June 15, 2021).

	<ul style="list-style-type: none"> ❖ Pre-Qualify Responsible Contractors seeking incentives for electrification ❖ Condition incentives on rigorous inspection and quality assurance processes to ensure equipment is installed and operating as designed.
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Supply Side	
All Building Decarbonization Subsectors	<ul style="list-style-type: none"> ❖ Use the state certified apprenticeship system to train workers involved in building electrification. ❖ Support and expand quality pre-apprenticeship programs to ensure that workers from disadvantaged communities can get into and succeed in state-certified apprenticeships. ❖ Track training program outcomes for graduation rates, attainment of industry-recognized credentials, job placement, retention, wages and wage progression.

Infrastructure Investments	
Alternative Building Decarbonization Investments	<ul style="list-style-type: none"> ❖ Couple targeted gas system pruning to neighborhood-scale carbon-free district energy pilots installed by gas infrastructure workers. The U.S. Department of Energy suggested district energy systems could expand from 17 today to 17,000 in 2050. San Diego should explore these solutions early, in order to scale them appropriately. ❖ Pilot waste-to-energy biomethane projects or green hydrogen demonstrations. These will be important technologies for hard-to-electrify end uses, such as industrial process heat. Gaining experience with these technologies, and exploring the job impacts early is worthwhile.

5 Energy

Overview of the Sector

As the RDF reflects, the electrification of buildings and transportation is the core of any pathway to decarbonization in the San Diego region, and assumes that the electricity available for these end uses is itself carbon-neutral. Achieving 100% renewable electricity by 2050 is the subject of Chapter 2 of the RDF, which, along with the RDF's Employment Impacts chapter, informs the following analysis and workforce recommendations.

The RDF geospatially assesses renewable energy production, to estimate capacity and identify potential resources in both San Diego and Imperial Counties. This mapping shows three main renewable resources available in the region:

- Solar: Utility-scale solar potential in the San Diego region accounts for 98.6% of renewable energy resources;
- Geothermal energy: No geothermal sites have been found in the San Diego region, but five have been identified in Imperial County. The RDF estimates that these five sites would generate a cumulative 1,900 jobs per year over a 10-year period. Once fully operational (around 2030), after satisfying Imperial County's electricity demand, 94.7% (based on population) of the geothermal firm power generated annually in Imperial County could go to the San Diego region;
- Wind: While high-quality land-based wind resources are relatively scarce in the region, the RDF notes that maximizing use of wind wherever possible is important to maintain resource diversity. Offshore wind was excluded from EER's modeling for the RDF⁴¹ but, if possible, would support a substantial number of supply chain, construction, and operations and maintenance jobs for skilled construction and manufacturing workers in the region.

To ensure grid reliability in deep decarbonization scenarios, the RDF recognizes that resources beyond wind and solar will be needed, including energy storage, retention of gas peaker plants, transmission upgrades, more interregional coordination for geographic diversity of power generation resources, and other options. The RDF also suggests maximizing infill and rooftop solar.

Not included in the RDF are other firm or dispatchable energy sources such as advanced nuclear, gas peaker plant conversion to hydrogen, or biomass. Thermal production of electricity, no matter the heat source, provides dispatchable power and supports workers currently employed in gas-fired power plants.

Climate Policy for the Energy Sector

Rather than identifying a recommended core scenario, the RDF seeks to inform policy decision-making with a series of scenarios from four different angles: renewable energy resource site selection; candidate project areas (CPAs) for solar/wind; infill and rooftop solar; and a low-cost, near-term scenario. It discusses these approaches in terms of reliability, co-benefits, least loss of land, cost, and equity, etc., and suggests that balancing these priorities "may be possible with available resources in the region" but that further study is needed to identify and adopt the best strategies.

⁴¹ Appendix 2.D. Key Assumptions in "San Diego Regional Decarbonization Framework."

In their discussion, the RDF authors highlight an approach that “maximizes rooftop and urban infill solar and energy storage in frontline communities” as offering multiple potential co-benefits. The RDF authors do not consider workforce issues.

Workforce Issues in Energy

Our assessment of workforce issues in the Energy sector focuses on renewable energy sources, primarily wind and solar, which we break down into two categories: utility-scale (feeding into “the grid,” i.e., a major centralized power grid) and distributed (generated near the place of use, without going through the utility power grid).

I. Utility-Scale Renewables

Utility-scale power refers to energy facilities, whether solar, wind, or a thermal source, which provide electricity utilities with energy by generating energy that they feed into the grid.

Since California’s Renewables Portfolio Standard (RPS) entered into effect in 2002, the construction of utility-scale renewable energy facilities in the state has successfully supported good jobs and high-road workforce outcomes. The sector’s creation of family-sustaining careers built on skills acquired in the state-certified apprenticeship system has been ensured because most such projects in the state have been governed by collectively bargained project labor agreements (PLAs).⁴² Resulting investments in the state’s apprenticeship system have ensured that the training workers receive has evolved to keep up with emerging technologies, avoiding skill shortages in the field.

There is also evidence that the state’s Renewables Portfolio Standard has supported equity, creating significant job opportunities for workers facing barriers to employment and from disadvantaged communities. This outcome has been aided by PLAs specifying apprentice utilization and targeted and local hire goals.

Exploring other firm and dispatchable (i.e. thermal) sources of electricity generation, green hydrogen, biomass, advanced nuclear, and solar thermal, as well as offshore wind, could create jobs for a wider range of workers than solar PV and wind do, including those workers facing eventual displacement due to decarbonization. On all utility-scale renewable projects, the County should require PLAs with targeted hire and registered apprentice utilization. Once renewable projects are built, maintaining job quality for operations and maintenance jobs is also essential.

In regard to equitable access to clean energy deployment, tracking job creation is needed to assess progress and identify areas for improvement. Research shows that equitable access and inclusion vary by affiliate, with the basic trades, such as laborers, often exhibiting higher levels of diversity and inclusion than the specialty trades, such as pipefitters, sheet metal workers or electricians.

⁴² Betony Jones, Peter Philips, and Carol Zabin, “The Link Between Good Jobs and a Low Carbon Future” (UC Berkeley Donald Vial Center on Employment in the Green Economy, July 2016), <http://laborcenter.berkeley.edu/the-link-between-good-jobs-and-a-low-carbon-future/>.

II. Distributed Renewables

Distributed energy, sometimes called on-site generation, refers to smaller-scale energy generation systems (up to 20 MW⁴³) operating at or near the location at which the power will be used. This energy can be produced from renewables, such as solar or wind energy, or nonrenewable sources such as natural gas via fuel cells. Here we focus on distributed renewables, rooftop solar making up the vast majority, although small-scale hydro, biomass, wind, and geothermal are also used in some cases.

Increasingly, distributed solar is paired with battery energy storage systems. Battery energy storage systems should be recognized as distinct technologies from solar rooftop, with different permitting and licensing requirements that reflect the different risks and hazards associated with these technologies connected to people's homes and businesses. California requires that battery electrical work is performed by state-certified electricians.

With distributed renewables, job quality is mixed and tends to be poorer on small projects. As discussed in the state High-Road Plan:

Generally, wages are much lower and career pathways are limited in smaller-scale (<1 MW) residential and commercial customer-sited solar installations, commonly called rooftop solar, compared to wages in utility-scale solar (>20 MW). Wages and benefits also differ within distributed solar depending on market segment and company size. Firms serving institutional or large commercial solar projects tend to compete on the basis of skill and qualifications, and are more likely to be unionized, whereas in the smaller distributed solar market, low-cost is the primary competitive driver among firms. Because of this difference in competitive dynamics, worker pay and benefits and the use of certified apprentices is greater on larger distributed solar projects (1-20 MW).⁴⁴ In addition, large solar projects entirely funded by state or federal dollars typically trigger prevailing wages which provide a floor on wages and benefits.

⁴⁵

As in the building sector, creating projects of scale in distributed renewables can open up opportunities for deploying positive workforce levers. In the context of rooftop solar, for example, this means supporting community-scale models, rather than individual homeowners' roofs, in order to facilitate contracting models that can require labor standards. Lower overall costs and efficiency gains are additional benefits of this larger-scale or aggregated approach.

Agencies implementing climate measures may be able to design programs to increase project scale. In the residential sector, where solar energy costs are generally the highest and subsidies have disproportionately benefited more-affluent homeowners, incentives can be concentrated on larger-scale community solar projects that focus on renters rather than on single-family rooftop installations and, in so doing, will lower the costs per MW even with higher wages.⁴⁶ Contracting models for energy efficiency and community solar that aggregate multiple small projects, all with the same contract terms, can more easily incorporate wage and skill standards.

Training for the main occupations in the construction and operations of utility-scale and distributed renewables should be via the state-certified apprenticeship system. Quality pre-apprenticeship programs

⁴³ According to the California Energy Commission (CEC) definition.

⁴⁴ Betony Jones, Peter Philips, and Carol Zabin, "The Link Between Good Jobs and a Low Carbon Future."

⁴⁵ From Chapter 6, Carol Zabin et al., "Putting California on the High Road: A Jobs and Climate Action Plan for 2030."

⁴⁶ Carol Zabin et al., "Advancing Equity in California Climate Policy: A New Social Contract for Low-Carbon Transition" (UC Berkeley Donald Vial Center on Employment in the Green Economy, September 13, 2016), <http://laborcenter.berkeley.edu/advancing-equity/>.

should be supported and expanded where necessary to ensure access to opportunity in this sector for underrepresented communities and workers facing barriers to employment.

Key Recommendations for the Energy Sector

Demand Side	
Utility-Scale Solar, Wind, Battery Storage, Geothermal, and Other Renewable Sources	<ul style="list-style-type: none"> ❖ Require PLAs with local hire on the construction of renewable energy projects. ❖ Support job quality on the operations and maintenance of local renewable energy projects.
Distributed Solar and Storage	<ul style="list-style-type: none"> ❖ Support models of distributed solar that are community scale rather than on individual homeowners’ roofs, to both lower costs per MW and to facilitate contracting models that can require labor standards. ❖ Identify program models that increase the scale of projects. ❖ Ensure licensing and certification requirements reflect the hazards and risks associated with battery energy storage systems
All Energy Subsectors	<ul style="list-style-type: none"> ❖ Incorporate responsible employer prerequisites in incentive programs that require compliance with all applicable labor and employment laws and set family-sustaining wage and benefit standards.

Supply Side	
All Energy Subsectors	<ul style="list-style-type: none"> ❖ Use the state certified apprenticeship system to train workers involved in the installation and construction of renewable energy facilities. ❖ Support and expand pre-apprenticeship programs to ensure that workers from disadvantaged communities can get into and succeed in state-certified apprenticeships. ❖ Track training program outcomes for graduation rates, attainment of Industry-recognized credentials, job placement, retention, wages and wage progression. ❖ Use job impact metrics to measure the impact of renewable energy construction on access and inclusion.

Infrastructure Investments	
Alternative Energy Sector Investments	<ul style="list-style-type: none"> ❖ Pursue state and federal funding opportunities for emerging renewable technologies such as hydrogen, advanced nuclear, and offshore wind partnering with labor and community groups on proposals. ❖ Geothermal with increased transmission between Imperial and San Diego Counties

6 Transportation

Overview of the Sector

On-road transportation is the San Diego region's largest source of greenhouse gas emissions, accounting for 45 percent of the county-wide total.⁴⁷ A portion of this is attributable to trucking, which serves as a critical link in the region's multimodal freight system. The most significant source, however, is automobile use, and tackling the region's high per capita driving rate is central to the strategy laid out in the RDF.⁴⁸

At its latest inventory in 2016, SANDAG estimated that passenger cars and light-weight vehicles accounted for around 40 percent of all greenhouse gas emissions within the San Diego region.⁴⁹ For a population of 3.3 million,⁵⁰ the County of San Diego had 2.4 million registered drivers in 2020⁵¹ and 3 million registered vehicles in 2019, 87% of which were automobiles.⁵²

Climate Policy for the Transportation Sector

Meeting emissions reductions mandates for 2030 and beyond will require significant changes in how the San Diego region's transportation systems are planned, funded, and built. The San Diego region's transportation decarbonization policy context is outlined in the RDF (3.2.) with a list of specific goals for the county. From this outline, we have focused on the following areas where workforce policy will be fundamental in ensuring job quality and job access:

- Increase the number of Electric Vehicles (EV) on the road and develop EV infrastructure (chargers and fast chargers).
- Reduce vehicle miles traveled (VMT) in the region by: increasing travel options, including supporting active transportation, and investing heavily in public transit to ensure complete coverage and a more user-friendly network of high-quality, high-speed connections between residential areas and employment centers and attractions. SANDAG's Complete Corridors, Transit Leap, Mobility Hubs, and Flexible Fleets strategies support these goals.

⁴⁷ "County of San Diego Climate Action Plan (2018 CAP)," Chapter 2-6 (Off-Road Transportation accounts for an additional 1%. Emissions from air traffic not included as this sector is under federal jurisdiction.)

⁴⁸ In 2017, the percentage of means of commuting to work in San Diego County was 76 percent driving alone and 3.1 percent use of public transportation. Based on the US Census Bureau's 2017 American Community Survey (ACS). "2017 Demographic Profiles: San Diego County" (County of San Diego, Health & Human Services Agency, Public Health Services, Community Health Statistic Unit, November 2019), <https://www.sandiegocounty.gov/content/dam/sdc/hhsa/programs/phs/CHS/demographics/2017%20Demographic%20Profiles.pdf>.

⁴⁹ Based on Figure 3.1 in "San Diego Regional Decarbonization Framework."

⁵⁰ "San Diego County, California: Population estimates, July 1, 2019," U.S. Census Bureau QuickFacts, accessed November 12, 2021, <https://www.census.gov/quickfacts/fact/table/sandiegocountycalifornia,CA/PST045219>.

⁵¹ California Department of Motor Vehicles, "Driver Licenses Outstanding by County, 2020," 2020, <https://www.dmv.ca.gov/portal/file/driver-licenses-outstanding-by-county-report-pdf/>.

⁵² California Department of Motor Vehicles, "Estimated Vehicles Registered by County," 2019, <https://www.dmv.ca.gov/portal/uploads/2020/06/2019-Estimated-Vehicles-Registered-by-County-1.pdf>.

Workforce Issues in Transportation

The analysis of employment effects in the RDF (Ch. 6) estimates that around 3,427 direct jobs in the vehicle sector will be generated annually through regional energy expenditure from 2021 to 2030 (RDF Table 6.2.). It further estimates that the prevalent job types in this sector are: 38.2% in transport (order fillers, freight movers, drivers), 13.7% in construction, 13.6% in manufacturing, and 16.3% in management or office and administrative support (RDF Table 6.10.A). Thus, while a small percentage of potentially affected jobs in transportation will be professional or white-collar (planners, engineers, data analysts, etc.), the large majority will be blue-collar.

Job quality and workforce concerns vary widely across the broad Transportation sector. Although there is always room to improve compensation, career ladders, and inclusion and access to opportunity for underrepresented groups, public-sector jobs within transit agencies largely adhere to strong labor practices. In construction, trucking and private passenger transport work, and vehicle manufacturing, however, both the RDF job impact analysis and the state High-Road Plan flag a risk of low-wage, poor-quality jobs.

Below, we discuss workforce issues sector by sector, and lay out recommendations for countering low-road risks and supporting positive workforce outcomes as the region creates its low-carbon transportation landscape.

I. Electric Vehicle Charging Infrastructure

The San Diego region has made EV adoption a kingpin in its climate action plan. To meet the county's emissions reductions goals, in line with state mandates, the San Diego RDF identifies ambitious targets for EVs on the road in the San Diego region by 2030, along with the EV battery charging stations or "chargers" to support them.⁵³

The work needed to install, maintain, and retrofit EV charging stations provides an opportunity to employ certified electricians who can upgrade their skills for this new technology. Implementing a workforce skill standard, such as requiring electricians working on EV charging infrastructure to be [EVITP](#)-certified, serves to screen out unqualified workers and contractors, create a return on investments in training, and ensure higher wages.

AB 841 (2020) requires EVITP certified electricians to install chapter stations funded or approved by California energy agencies. The San Diego Metropolitan Transit System (SDMTS) also has an EVITP requirement.

EVITP (Electric Vehicle Infrastructure Training Program), developed by the National Electrical Contractors Association and the International Brotherhood of Electrical Workers, is a skill certification that has been integrated into electrician apprenticeship programs. This standard ensures both skills and family sustaining wages, and aligns with state certified apprenticeship programs for electricians. EVITP certification is required for charging stations funded by state agencies such as the CEC, the CPUC and the CARB.

Since the EVITP is a journey-upgrade training program for the electrical trade, it expands opportunities for apprentices in the state-certified electrical apprenticeship programs. As more work is available, new apprenticeship slots can open up to provide entry for graduates of apprenticeship preparation programs. As

⁵³ Targets range. The RDF cites these examples: The SANDAG 2021 Regional Plan states a target of 450,000 EVs supported by 40,000 chargers by 2030; the 2030 target in the San Diego Regional Electric Vehicle Gap Analysis 771,000 EVs supported by 139,000 Level 2 chargers, 16,200 DC fast chargers, and 47 hydrogen fueling stations.

work increases for EVITP-certified electricians, the pipeline into middle-class construction jobs also expands. As long as pre-apprenticeship programs are in place to help disadvantaged workers access and succeed in apprenticeship, inclusion will be supported.

II. Public Transit

As the key to moving more people more miles with fewer emissions, public transit is an important part of the San Diego region's decarbonization goals, particularly VMT reduction. The county's Transit Leap strategy calls for "a multimodal high-speed, high-capacity, high-frequency transit network that appeals to people who otherwise drive alone"; and its Mobility Hub strategy aims to encourage transit ridership and connect residents to transit, with various approaches depending on density.⁵⁴

Increasing use of public transit and building out services for first- and last-mile travel, while at the same time electrifying transit and other vehicles, will result in increasing jobs for drivers and require skill upgrading for mechanics so that they can repair electric powered vehicles along with or in lieu of internal combustion engines.

Here we focus on issues affecting the public-sector transit workforce (drivers, repair, maintenance, etc.), as well as workers in the TNC (Transportation Network Companies) sector. Zero-emission bus (ZEB) manufacturing and procurement is discussed below, in the Cleaner Vehicles section (IV), and workforce analysis in the areas of new transit infrastructure is covered in section V.

The public transit sector provides some of the best wages and benefits for workers with no college education, and has provided access to family-supporting jobs for women and people of color.⁵⁵ These are largely unionized public-sector jobs, offering comprehensive benefit packages that include pensions and retiree health care.⁵⁶

In contrast, risks of job insecurity and poor compensation run high in the TNC (Transportation Network Company) sector. The combination of convenience, reliability, and relatively low cost for users have spurred a major rise in app-based ride-hailing services, commonly referred to as TNCs.⁵⁷ To be effective, any GHG emissions reduction strategy to decrease VMT must consider TNCs and their impacts on transit. Studies have found that even in transit-rich cities or cities working to improve transit and density around transit, the growth of TNCs can lead to more driving.⁵⁸ However, particularly where transit options are nonexistent or limited, TNCs can play an important part in reducing VMT. As a key VMT reduction action, the RDF recommends: "In existing rural, non-infill, or underserved transit areas, invest in TNC partnerships prioritizing electric and high-occupancy vehicles to ensure sufficient access to opportunities."

⁵⁴ "San Diego Regional Decarbonization Framework."

⁵⁵ Beverly G. Ward and Eric T. Hill, "Women in Transit: Findings from African-Americans, Other Minorities, and Women in the Transit Industry," *Women's Travel Issues: Proceedings from the Second National Conference* FHWA-PL-97-02 (October 1996), <https://www.fhwa.dot.gov/ohim/womens/chap32.pdf>.

⁵⁶ Pew Research Center, "America's Shrinking Middle Class: A Close Look at Changes Within Metropolitan Areas," May 11, 2016, <http://www.pewsocialtrends.org/2016/05/11/americas-shrinking-middle-class-a-close-look-at-changes-within-metropolitan-areas/>.

⁵⁷ Lawrence Mishel, "Uber and the Labor Market: Uber Drivers' Compensation, Wages, and the Scale of Uber and the Gig Economy" (Economic Policy Institute, May 15, 2018), <https://epi.org/145552>.

⁵⁸ Bruce Schaller, "Unsustainable? The Growth of App-Based Ride Services and Traffic, Travel and the Future of New York City" (Schaller Consulting, February 27, 2017), <http://schallerconsult.com/rideservices/unsustainable.pdf>.

Working with the TNC industry is an opportunity for the county to coordinate overall efficiency in VMT, encourage TNC adoption of vehicles ensuring lower emissions per passenger, and support higher-quality employment in this notoriously low-road sector.

For projects that use public funding, responsible employer policies can be deployed to support wage and labor standards while incentivizing cleaner vehicles for TNCs. Similarly, inclusive procurement policies can be implemented in programs where public transit agencies contract with transportation network companies (TNCs) for first- and last-mile trips. A public rideshare service can be set up in partnership with TNCs, stipulating employment of transit worker union drivers.

EXAMPLE:

- To improve transit options and expand ridership, in January 2019 LA Metro launched a first/last mile pilot project in partnership with a local TNC called Via. In its first year, the program resulted in over 80,000 rides to and from transit stations, proving effective as a high-quality first/last mile solution. It was also found successful in its accessibility aims: ensuring equal access and equivalent service for individuals with disabilities and low-income populations; and delivering first/last mile rideshare service to unbanked individuals and those without a smartphone.⁵⁹ Based on the success of the two-year pilot, in January 2021, LA Metro introduced its permanent rideshare service, Metro Micro, in partnership with a TNC called RideCo, which employs union drivers.^{60, 61}

Worker protections and labor standards can be incorporated into comprehensive regulations of TNCs that also address congestion and vehicle miles traveled (VMTs), e.g., through licensing or rules and fees on access to curb space and public streets.

In terms of workforce development, expansion of public transit and the incorporation of electric transit vehicles requires training drivers and skills upgrading for transit agency maintenance and repair mechanics.

[California Transit Works!](#) (CTW) is a statewide consortium of transit agencies, labor unions, and community colleges that promotes high road training partnerships (HRTPs) to address critical issues in public transit.⁶² SD Amalgamated Transit Union (ATU) Local 1309 and San Diego Metropolitan Transit System are planning to join CTW. This infrastructure can jumpstart high-road workforce development in San Diego, building pipelines into public transit-sector careers for disadvantaged workers while also helping transit agencies prepare for the retirement of an aging workforce.

EXAMPLE:

- The San Jose-based Amalgamated Transit Union (ATU) Local 265 and the Santa Clara Valley Transportation Authority (VTA) implemented a joint workforce investment partnership in 2008.⁶³ Now operating as a partnership between the Santa Clara VTA, ATU Local 265, and Mission College, the Transit Apprenticeships for Professional Career Advancement (TAPCA) trains participants to advance their careers in the transit industry through four stackable apprenticeships, creating pathways for

⁵⁹ Shaun Miller et al., “Mobility on Demand (MOD) Sandbox Demonstration: LA Metro First/Last Mile Partnership with Via - Final Report” (U.S. Department of Transportation - Federal Transit Administration, October 2021), <https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-10/FTA-Report-No-0201.pdf>.

⁶⁰ Elijah Chiland, “Metro MicroTransit Service Would Add Uber-like Shuttles to LA’s Transportation Network,” *Curbed LA*, October 9, 2017, <https://la.curbed.com/2017/10/9/16449460/la-metro-micro-transit-shuttle-uber-lyft>.

⁶¹ Anna Chen, “Metro Is Hiring — Become a Driver for Metro Micro,” July 20, 2021, <https://thesource.metro.net/2021/07/20/metro-is-hiring-become-a-driver-for-metro-micro/>.

⁶² California Transit Works!, “CTW California Transit Works!,” accessed January 19, 2022, <http://www.catransitworks.org/who-we-are.html>. [catransitworks.org/who-we-are.html](http://www.catransitworks.org/who-we-are.html).

⁶³ California Transit Works!, “CTW California Transit Works!”

workers to move from entry-level jobs into higher-skilled, higher-paying jobs.⁶⁴ The program, which incorporates intergenerational skill transmission, is also helping prepare a new generation of skilled transit workers in anticipation of a wave of retirements at Santa Clara VTA.⁶⁵

CTW training partnerships cover not only transit drivers and operators but also transit occupations such as mechanics, track workers, and overhead line workers. The maintenance and repair workers employed by transit agencies who have been trained to work on internal combustion engines need skill-upgrade training to be able to maintain and repair zero-emission and hybrid technology vehicles. By providing transit workers with these new skills, CTW is allowing transit agencies to build a pool of maintenance workers trained in servicing both internal combustion and battery-electric propulsion systems.

Another area in which high-road workforce development can offer mutual benefits for both workers and transit agencies is in the field of innovative contracting to incorporate first/last mile travel into transit systems. This requires technical know-how that public transit agencies and regional transportation planning authorities can achieve with capacity building, opening up new skilled, good paying jobs or career advancement opportunities.

III. New Transit Infrastructure and Infill Development

Alongside its strategies to accelerate VMT reduction through expansion of public transit, electric vehicle (EV) adoption and develop EV infrastructure, the San Diego region has prioritized VMT reduction through a combination of land use policies and infrastructure development. This includes investments in transit infrastructure and operations, active transportation infrastructure (such as bicycle and pedestrian bridges, trails/lanes, etc.), and construction of multifamily and mixed-use infill development. By concentrating housing near workplaces and transit options, these investments provide alternatives to driving, particularly driving alone thus reducing the total miles people must travel by car.

The RDF identifies a number of VMT reduction strategies that involve or relate to transit infrastructure and infill development, such as:

- Investing in capital infrastructure for expanding geographic reach of rail services in areas where development can support transit use;
- Incentivizing higher-density infill and transit-oriented development;
- Designing walkable communities, particularly in places where compact development patterns are already established;
- Restructuring goods distribution centers to enable more efficient delivery patterns that enable short-haul electrified freight vehicles.⁶⁶

These policies intend to drive shifts in land use and travel patterns that will necessitate significant infrastructure development and upgrading, including capital investments in rail, construction and

⁶⁴ “High Road Training Partnership: The High Road to Public Transit,” June 2019, https://cwdb.ca.gov/wp-content/uploads/sites/43/2019/11/High-Road-to-Public-Transit-11-25-2019_ACCESSIBLE.pdf.

⁶⁵ “Pioneering Apprenticeship Program Adding Job Opportunities,” Mission College Santa Clara, accessed December 29, 2021, https://missioncollege.edu/news/press/releases_2016/2016-11-14_apprenticeship.html.

⁶⁶ Non-exhaustive list, excerpted from Table 3.6. VMT Reduction Strategies and County Implementation Approach, “San Diego Regional Decarbonization Framework.”

rehabilitation for road improvements, streetscaping, underground utilities, and stormwater and drainage systems.

Along with investments in transit capital projects, infill development, and other transit-oriented development, these strategies require investments in physical infrastructure. These new investments will largely generate jobs in the construction industry, most of which will be blue-collar construction trades jobs. Wages and working conditions in these jobs vary considerably depending on whether or not the workers belong to a union.⁶⁷ When strategies to support infill development and transit expansion fall under the category of public works, contractors are generally required to pay prevailing wages.⁶⁸

State legislation establishes a “skilled and trained” workforce requirement for the construction affordable housing, including Senate Bill 35 (Wiener, Chapter 366, Statutes of 2017)⁶⁹ and Assembly Bill 73 (Chiu, Chapter 371, Statutes of 2017),⁷⁰ both of which created streamlined approval processes for certain types of housing developments.⁷¹

For transit infrastructure, California cities commonly use project labor agreements (PLAs) and community workforce agreements (CWAs) to maximize the economic benefits of development projects and create jobs for local residents.⁷² Some agencies that require PLAs for major subsidized housing developments and transit system expansion projects turn the PLA into a CWA by including targets for local hiring, setting goals for apprenticeship utilization and for participation of disadvantaged workers to expand access to women and other workers underrepresented in the construction trades. For transit system expansion, large transit agencies (e.g., Los Angeles County Metro,⁷³ BART,⁷⁴ SFMTA,⁷⁵ and AC Transit⁷⁶) regularly establish PLAs for large construction projects.

IV. Cleaner Vehicles

Even though vehicle manufacture is not a major industry in the San Diego region, inclusive practices for the procurement of publicly-owned buses and other fleet vehicles are a powerful use of public dollars for the

⁶⁷ George I. Long, “Differences between Union and Nonunion Compensation, 2001–2011,” *Monthly Labor Review*, U.S. Department of Labor, Bureau of Labor Statistics 136, no. 4 (April 2013): 16–23.

⁶⁸ California Department of Industrial Relations, “Prevailing Wage Requirements,” October 2016, <https://www.dir.ca.gov/public-works/prevailing-wage.html>.

⁶⁹ Wiener, SB-35: Planning and zoning: affordable housing: streamlined approval process.

⁷⁰ Chiu, AB-73: Planning and zoning: housing sustainability districts.

⁷¹ Wiener, SB-35: Planning and Zoning: Affordable Housing: Streamlined Approval Process; Chiu, AB-73: Planning and Zoning: Housing Sustainability Districts.

⁷² Partnership for Working Families, “Policy & Tools: Responsible Contracting,” 2015, <http://www.forworkingfamilies.org/page/policy-tools-responsible-contracting>.

⁷³ Los Angeles County Metropolitan Transportation Authority, “Project Labor Agreement & Construction Careers Policy,” LA Metro, accessed February 28, 2022, <https://www.metro.net/about/placcp/>.

⁷⁴ Bay Area Rapid Transit, “BART Major Projects Project Stabilization Agreement (PSA) Summary of Workforce Goals and Steps Towards Establishing Good Faith Efforts for Contractors,” n.d., <https://www.bart.gov/sites/default/files/docs/Summary%20of%20Workforce%20Goals%20and%20GFE%20Steps%20for%20Contractors.pdf>.

⁷⁵ SFMTA, “SFMTA MOUs, CBAs and Labor Organizations / Unions,” accessed February 22, 2022, <https://www.sfmta.com/about-us/labor-relations/sfmta-mous-cbas>.

⁷⁶ “Project Labor Agreement, AC Transit, Bus Rapid Transit Project” (Alameda Contra Costa Transit District, n.d.), <http://www.actransit.org/wp-content/uploads/purchasing/Attachment%20B%20-%20Project%20Labor%20Agreement.pdf>.

public good. With a cluster of electric bus manufacturers in the Los Angeles area, it is unlikely that county policy can induce new electric vehicle assembly in San Diego, but inclusive procurement can still be incorporated even if the benefits accrue to workers elsewhere.

Job quality can vary significantly in the clean vehicle manufacturing sector. In California, labor concerns have been raised in both light- and heavy-duty low- and zero-emission vehicles (LEV/ZEV) manufacturing, following reports of unpaid wage claims, lax workplace health and safety, and employer retaliation against workers exercising their legally-protected rights.⁷⁷ In zero-emission bus (ZEB) and rail manufacturing, however, some California companies have unionized workforces, which generally indicates higher job quality (including higher compensation, including healthcare and retirement benefits) compared to non-unionized workforces.⁷⁸

High-road procurement practices can be effective in supporting good jobs by factoring job quality, employer commitments to training, and inclusionary hiring, rather than just cost, into the proposal evaluation process. This approach is used by the [U.S. Employment Plan](#) (USEP), a best-value public transit procurement process developed by the nonprofit Jobs to Move America for use by public transit agencies. Over the past decade the USEP has established a strong track record in ensuring job quality in LEV/ZEV vehicle procurement by major transit authorities across the United States. The state High-Road Plan describes the aims and components of this high-road transit procurement plan:

The USEP provides model language for procurement in competitive solicitations that gives bidders an opportunity to disclose detailed information about the location and number of new jobs that would be created or sustained as well as the number of disadvantaged and under-represented workers to be hired. The U.S. Employment Plan was designed to level the playing field for high-road manufacturers that supply buses, rail cars, and other large capital equipment to public transit agencies, and has been adopted by some of the nation's largest urban transit authorities. The USEP has three components that agencies can incorporate into their procurement language:

- Proposal Guidelines including pre-approved forms that capture the number and quality of U.S. jobs to which a proposer is committing on the contract, including details regarding expected wages, employer-provided benefits, and workforce training investments; plans to generate employment opportunities for disadvantaged and underrepresented workers through partnerships with community-based organizations; and plans to invest in domestic production facilities or sites;
- Evaluation Guidelines with scoring criteria to evaluate competing proposals and reward companies that demonstrate a commitment to creating good U.S. jobs, hiring disadvantaged and underrepresented workers, advancing workforce development, and investing in U.S. facilities; and

⁷⁷ Cited from the High-Road Plan, based on review of the California Department of Industrial Relations (Division of Occupational Safety & Health and the Division of Labor Standards Enforcement) inspections and investigations since 2011 of zero-emission vehicle (ZEV) manufacturers that have received state funding for workforce and capital/production investments.

⁷⁸ Ann C. Foster, "Differences in Union and Nonunion Earnings in Blue-Collar and Service Occupations" (U.S. Department of Labor, Bureau of Labor Statistics, June 25, 2003), <https://www.bls.gov/opub/mlr/cwc/differences-in-union-and-nonunion-earnings-in-blue-collar-and-service-occupations.pdf>.

- Enforcement Language to be included in an awarded contract that legally obligates companies to meet the hiring, job quality, equity, and workforce investment commitments made in their winning proposals.⁷⁹

In addition to sample language provided in template form use by transit agencies, the [Full U.S. Employment Plan Model RFP](#), the [USEP webpage](#) contains links to real-life examples of competitive procurement solicitations that have adopted the USEP process and language, issued by major transportation agencies such as LA Metro, the Chicago Transit Authority (CTA), Amtrak, and others.

The USEP scoring and bid evaluation process can include a preliminary selection of bidders within the competitive range, who can then be given the opportunity to modify sections of their proposal to arrive at their best and final offer. Agencies responsible for the procurement score applications to reward applicants that make concrete commitments to creating family-supportive jobs and expanding job access. After comparing the final proposals in full and determining which one offers the best overall value (e.g., assessing price, technical specifications, past performance, and managerial approach, as well as job and equity commitments), agencies can then determine which bidder to award the contract.

EXAMPLE:

- The Los Angeles County Metropolitan Transportation Authority (LA Metro) has successfully used the USEP eight times since 2011. In 2018, LA Metro adopted a permanent U.S. Employment Plan policy in which all future procurements of new manufactured vehicles and equipment above \$100 million will include the USEP. To make its bid to LA Metro more competitive, the zero-emission bus (ZEB) manufacturer BYD committed to a community hiring program and pre-hire program under a Community Benefits Agreement (CBA) with the Jobs to Move America coalition, including a specific target of recruiting and hiring 40 percent of its workers from populations facing significant barriers to employment (e.g., veterans and formerly-incarcerated individuals).⁸⁰

Additional discussion of the USEP and examples of its use can be found in [Appendix B](#), including a section entitled “Heavy-Duty Transit Vehicle Manufacturing—Procurement for the Public Good.”

V. Trucking

The San Diego region has a multimodal freight system (e.g., ship, rail, air) in which commercial trucking is a vital link. Heavy-duty trucks and vehicles accounted for around 7 percent of GHG emissions in the San Diego region in 2016.⁸¹ Because diesel fuels, the dominant fuel source for long-haul trucking, generate harmful pollutants (ozone and particulate matter), reducing emissions from trucking is an important climate action.

The decarbonization of heavy-duty vehicles, and the broader freight system, is not yet well-developed in the San Diego RDF, which at this stage tackles the region’s largest source of emissions: passenger and light-weight vehicles. We have therefore limited our workforce analysis and recommendations pertaining to the trucking sector to the following guiding principles.

⁷⁹ From Chapter 7 in Carol Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

⁸⁰ “Our CBA with the Electric Bus Builder BYD,” Jobs to Move America, accessed February 15, 2022, <https://jobstomoveamerica.org/resource/community-benefits-agreement-with-byd/>.

⁸¹ Based on Figure 3.1 in “San Diego Regional Decarbonization Framework,” according to data from SANDAG.

In both short- and long-haul trucking, independent contracting is widespread and results in poor labor conditions. The high turnover in the sector is not good for workers or for controlling emissions, as we know that efficiency in fuel and truck usage increases with driver training and experience. Improving labor conditions to invest in and retain experienced drivers can reduce not only fuel and vehicle costs, but also GHG emissions. When trucking companies do bear the full costs of the trucks and classify drivers as employees rather than independent contractors, two things happen: the companies have the incentive to save on the cost of purchasing and operating trucks, and they have the fleet capacity to implement these cost savings.⁸²

In the short-haul trucking subsector, where growth in demand for last-mile delivery has accelerated as a result of e-commerce, electrification is a feasible solution and measures can be taken to support good jobs.⁸³ For example, freight EV chargers at distribution centers can set up preferential rates and charging access for firms that utilize employees rather than independent contractor distribution and delivery drivers.

Key Recommendations for the Transportation Sector

Demand Side	
Electric Vehicle Charging Infrastructure	❖ Adopt the requirement that electric vehicle charging stations be installed by EVITP -certified electricians

⁸² Steve Viscelli, *The Big Rig: Trucking and the Decline of the American Dream* (University of California Press, 2016).

⁸³ California Air Resources Board, “Proposed California Phase 2 Greenhouse Gas Standards (CA Phase 2 GHG) and Potential Amendments to the Tractor-Trailer GHG Regulation” (Sacramento, California, August 31, 2017), https://www.arb.ca.gov/msprog/onroad/caphase2ghg/20170831_workshop_presentation.pdf.

Public Transit	<ul style="list-style-type: none"> ❖ Expand funding for public transit, maintaining current high road labor standards. ❖ Support innovative programs that incorporate micro-transit services for first- and last-mile mobility as part of public transit systems. ❖ Incorporate inclusive procurement policies in programs where public transit agencies contract with transportation network companies (TNCs) for first- and last-mile trips. ❖ Incorporate worker protections and labor standards in comprehensive regulations of TNCs that also address congestion and vehicle miles traveled (VMTs), e.g., through licensing or rules and fees on access to curb space and public streets. ❖ Incorporate responsible employer policies for projects that use public funding to incentivize cleaner vehicles for TNCs.
New Transit Infrastructure and Infill Development	<ul style="list-style-type: none"> ❖ Use creative incentives to encourage infill and developers to build closer to the number of units for which the property is zoned. This will encourage larger and taller buildings, which require a more highly skilled, and often unionized, workforce. ❖ Require Project Labor Agreements (PLAs) or Community Workforce Agreements (CWAs) for transit infrastructure expansion projects.
Cleaner Vehicles	<ul style="list-style-type: none"> ❖ Use inclusive procurement policies for public procurement of buses and other fleet vehicles, e.g., with scoring criteria that reward applicants that commit to hiring disadvantaged and/or under-represented workers. ❖ Use the Jobs of America U.S. Employment Plan (USEP) to incorporate workforce policies and practices into competitive solicitations for public procurement of new zero- and low-emission vehicles (ZEVs/LEVs).
Trucking	<ul style="list-style-type: none"> ❖ Attach a responsible employer policy to any public assistance for the purchase of clean trucks (rebates, loans, pilot program grants, etc.), e.g., stipulating that firms receiving such assistance must 1) operate those trucks with their own employee drivers, and 2) be free of outstanding judgments against them for unpaid wages or other violations of labor laws.

	<ul style="list-style-type: none"> ❖ Institute a similar responsible employer policy for any trucking services contracted out by public agencies. ❖ Support EV charging for freight at distribution centers, and preference rates and charging access on firms that utilize employees rather than independent contractor distribution and delivery drivers.
All Transportation Subsectors	<ul style="list-style-type: none"> ❖ Use job impact metrics to measure and track the effect of climate policies on job numbers, job quality, and job access.

Supply Side	
Electric Vehicle Charging Infrastructure	<ul style="list-style-type: none"> ❖ Ensure that pre-apprenticeship programs are in place to help disadvantaged workers access and succeed in electrician apprenticeship.
New Transit Infrastructure and Infill Development	<ul style="list-style-type: none"> ❖ Participate in High Road Construction Careers, a statewide initiative that includes pre-apprenticeship training linked to expanding the use of CWAs in construction.
Trucking	<ul style="list-style-type: none"> ❖ Redirect funding away from low-road employers who misclassify truck drivers as independent contractors.
All Transportation Subsectors	<ul style="list-style-type: none"> ❖ Support professional development and capacity building in transit agencies and regional transportation planning authorities. ❖ Track training program outcomes for graduation rates, attainment of Industry-recognized credentials, job placement, retention, wages and wage progression.

7 Lands

Overview of the Sector

Natural climate solutions and emissions reductions in agriculture are an important component of decarbonization, as land use can emit greenhouse gases but also some land uses act as a carbon sink. Although important, the contribution of lands to the overall regional decarbonization strategy is much more limited than changes to the energy, transportation, and building sectors. The lands sector was not included in the RDF decarbonization model, and very little data is available for analysis of current emissions, storage, or capture.

Natural climate solutions involve natural sequestration and medium to long-term storage of carbon dioxide in lands and natural habitat, including wetlands and “blue carbon”—the ocean. It should be emphasized that natural climate solutions alone cannot generate enough negative emissions in the San Diego region to achieve net zero emissions. The main strategy is preservation of existing natural lands to avoid changes in land use that both disrupt naturally occurring carbon capture and storage and shift to greenhouse gas emitting activities.

Agriculture generally is a net carbon emitter, due to methane release from livestock and farm animals, soil bacteria, and some production techniques. Agricultural production also stores carbon and can be enhanced to increase carbon capture and storage, sometimes known as climate farming (RDF, Chapter 4). The primary strategies to address carbon sequestration and to lower emissions in existing agriculture are to change farming practices to increase carbon storage in soils, and to prevent emissions. Examples include increasing compost, planting cover crops, planting perennial plants and trees rather than annual crops, restoring riparian areas on farms, and practicing low-till agriculture. Policies to encourage climate farming are very new, with much effort to gather better baseline data and actual state programs in their infancy. These include funding for energy efficient irrigation systems, conservation easements along watersheds and similar programs.

The RDF makes the following key points about maximizing the climate benefits of the lands sector:

“To reach net zero, natural and working lands need to act as stronger *net* sinks than they currently do, which means investment in natural climate solutions and minimizing carbon emissions from the land. In order to accurately account for net carbon land use emissions, local data need to be collected and integrated into regional carbon calculations.

- The most effective and most inexpensive natural climate solution in the San Diego region is to avoid land use change. [Key here is supporting SANDAG’s urban growth plans that promote densification, which we address in the Transportation chapter].
- Other important regional natural climate solutions considered here are less effective and more expensive and include carbon farming, wetland protection and expansion, and urban forestry. Other solutions are large-scale habitat restoration and reforestation, which is expensive and may not be effective.
- The natural climate solutions considered here include co-benefits of ecosystem services (e.g., water and air quality improvements, ecological resilience, biodiversity protection) and economic, social, and public health benefits (e.g., energy savings and localized public health improvements from increased urban tree cover) that may help justify the cost of natural climate solutions, even in circumstances where carbon sequestration and storage may be relatively low” (RDF Chapter 4).

Climate Policy for the Lands Sector

The RDF Lands chapter puts forth the following key strategies:

1. Protect and preserve natural and working lands because these lands sequester and store carbon naturally.
2. Restore wetlands and surrounding areas.
3. Increase urban tree canopy cover.
4. Incentivize carbon farming techniques like compost application, riparian restoration, and orchard tree retention.

We divide the workforce issues related to Lands into the following buckets: 1) natural land preservation and restoration and urban greening, and 2) agriculture.

Workforce Issues in Natural Lands Preservation and Restoration; and Urban Greening

Avoiding changing the land use of natural habitat, restoring existing habitat, implementing other land conservation measures and greening the urban landscape are the key policies to address greenhouse gas emissions in this sector. These activities are generally all considered services performed by government. Occupations vary, and are not well defined in the Bureau of Labor Statistics occupation codes. Here too we expect blue-collar jobs to predominate, including landscapers and gardeners, conservation workers, etc. and a smaller proportion of professional workers such as soil scientists and environmental planners.

As these are publicly funded activities, the workers who carry out these services are often public employees, covered by public employee collective bargaining contracts with family supporting wages, benefits and sometimes career paths. In some cases, they are employees of private businesses who have contracts with local government agencies. When these services are contracted out to private or non-profit businesses, there is a danger of a decrease in job quality, as has occurred in many privatized public service contracts.

Job quality can be ensured when activities associated with greening of urban landscapes and conserving and restoring natural lands are carried out with public sector workers. Therefore, expanding public sector employment is a high road strategy. If local governments decide to contract out these activities, they can still ensure job quality through bidding processes that incorporate one or more of the labor demand policy levers as described in Chapter 2. Promoting bidding processes based on maximizing quality and the economic development benefits of public investment is a tried-and-true strategy with successful examples in California, as illustrated in the state High-Road Plan. These high road contracts include services, such as the procurement of waste services, and manufacturing, such as the procurement of electric buses for public transit. Such contracting language can also be applied to the activities discussed here, from urban tree planting to wetlands restoration.

This subsector also offers the opportunity to develop or expand inclusionary hiring practices for these family-supporting jobs. The extent to which diversity and inclusion exist in the family supporting public sector jobs tends to vary by local government agency, and there may be room for improvement. If so, a key opportunity exists to create high road training partnerships with local government agencies. Together, the public agency employer, the union representing the workers, and community colleges or other training institutions can develop preparatory programs for these jobs, using the same methodologies of the pre-apprenticeship programs described in Chapter 3.

Workforce Issues in Agriculture

Agriculture is almost exclusively a private sector activity, and farm labor remains one of the lowest wage jobs in the state. At the same time, policies to encourage these climate farming methods are generally very small grant or incentive programs that buy down the cost of these changes in practice, and do not have a significant impact on the labor market dynamics of the sector.

If San Diego governments choose to augment state climate agricultural programs, they can also fund grant and incentive programs. In doing so, they can set requirements for minimum wage and benefit levels for workers working on the grants. However, given the likely small size of any grant or incentive program, climate farming policies are unlikely to influence the wages and working conditions in this sector.

Key Recommendations for the Natural and Working Lands Sector

Demand Side	
Urban Forests, Wetlands, and Coastal Carbon Sinks	<ul style="list-style-type: none"> ❖ Maximize the expansion of public sector jobs for urban forestry, wetlands conservation and other activities that increase the carbon sink role of lands ❖ When subcontracting these activities to private sector firms, Use inclusive procurement policies for public procurement grants programs for urban forests, wetlands, and coastal carbon sinks.
Agriculture	<ul style="list-style-type: none"> ❖ Use inclusive procurement policies for public procurement grants programs for “climate farming” in agriculture.
All Natural and Working Lands Subsectors	<ul style="list-style-type: none"> ❖ Incorporate responsible employer prerequisites in incentive programs that require compliance with all applicable labor and employment laws

Supply Side	
Urban Forests, Wetlands, and Coastal Carbon Sinks	<ul style="list-style-type: none"> ❖ Expand high-road industry partnership initiatives to include urban forestry and related activities, particularly in the public and non-profit sectors. ❖ Incorporate new hire training in the HRTPs to ensure pathways into these good jobs for workers from disadvantaged communities
Agriculture	<ul style="list-style-type: none"> ❖ Support high-road training partnerships (HRTPs) as climate strategies for agriculture development.
All Natural and Working Lands Subsectors	<ul style="list-style-type: none"> ❖ Track training program outcomes for graduation rates, attainment of Industry-recognized credentials, job placement, retention, wages and wage progression.

8 Just Transition: Tools and Strategies

As the San Diego region's economy moves away from activities that emit greenhouse gasses in favor of climate friendly alternatives, shifts can be expected: the ramping up of low-carbon solutions and sectors, and contraction in heavy-emitting industries. The modeling used for the San Diego Regional Decarbonization Framework (RDF) indicates that decarbonization will result in net job creation overall, with the gains in low-carbon sectors surpassing declines in other sectors. However, this process is not seamless. Creating jobs is not enough to prevent negative impacts on workers. If the emerging jobs are not at least as high-quality as the jobs being lost, workers will lose out. If the emerging jobs are in substantially different occupations and more distributed energy industries, incumbent energy-sector workers could face a difficult transition.

There are therefore multiple aspects to protecting affected workers: those who can be redeployed in the low-carbon economy must remain securely employed at comparable skill and compensation levels; and those who face job loss must be provided with retraining, bridges to retirement, or other measures to preserve their financial security. These are challenging objectives, but achieving them is possible and requires robust planning and stakeholder engagement that must begin now.

In the San Diego region, researchers project a decline in fossil fuel jobs beginning after the year 2030.⁸⁴ A contraction rate of -75% in the county's natural gas sector has been estimated for the period from 2031 to 2050. It is important to remember that 2030 is less than a decade away. Avoiding job displacements down the road requires robust planning and action today, by policymakers working hand in hand with labor and industry partners. Acting now, the San Diego region can begin to implement a smooth and just transition for its fossil fuel workforce, rather than pushing workers off a cliff when contraction actually occurs.

[Appendix D](#) provides background information on the evolution of Just Transition strategies since the 1970s. As history has shown, the smoother the transition, the more cost effective and easier to manage these measures will be, and the greater the protection they will provide for workers. Examples of successful programs also show the importance of early planning and the meaningful involvement of diverse stakeholder coalitions that include workers, communities, and labor unions.

Below we set out the policy framework for a Just Transition in the San Diego region, including both the necessity of placing displaced workers in comparable jobs, providing a safety net for those near retirement or otherwise unable to be redeployed, and robust retraining for those interested in pursuing an alternative career. We then address in more detail the specific context of risk of job loss in the San Diego region and the specific opportunities for worker redeployment.

Policies to Support Displaced Fossil Fuel Workers

Displaced fossil fuel workers need to be supported as employment in fossil fuel jobs contracts over the 2031–2050 period. The priority goal of a truly just transition is to minimize or eliminate the need for worker transition assistance. This goal can be accomplished by aligning capital investments with projects that utilize the same occupations as an industry in decline, and engaging in long-term planning that aligns a contracting workforce with worker retirements. When redeployment in comparable jobs is not possible for all workers, the policies outlined by Pollin et al. in Chapter 6 (p. 199) of the RDF are generally recognized as a robust approach to Just Transition. This approach recognizes that support will have to be tailored to individual workers' situations, depending on their age, phase in their career, skill portfolio, relocation possibilities, and

⁸⁴ Pollin et al., Chapter 6 in "San Diego Regional Decarbonization Framework."

capacity and aspirations for retraining, among others. Noting the need for different types of support for workers at different stages in their careers, Pollin et al. present the following policies:⁸⁵

1. Pension guarantees for all workers in fossil fuel-based industries, especially those workers who will be retiring voluntarily over the transition period and bridges to retirement for workers close to retirement.
2. Reemployment guarantees for all displaced workers.
3. Wage insurance for all displaced workers. One approach is to guarantee 3 years of total compensation at levels the workers had been receiving in their fossil fuel jobs.
4. Retraining support. This could include 2 years of retraining support for workers who required this in their new areas of employment.
5. Relocation support. This should be sufficient to cover full moving expenses for all workers who are forced to relocate.
6. Health care coverage for all workers during transition.⁸⁶

Newsom Administration Action on Just Transition

The Newsom administration is beginning to grapple with supporting Just Transition strategies across the state. The California Governor’s Office of Planning and Research (OPR) website states the following:

In September 2020, Governor Newsom signed [Executive Order N-79-20](#), directing the OPR to partner with the Labor and Workforce Development Agency (LWDA) to design and deliver the state’s first Just Transition Roadmap by July 2021.

The Just Transition Roadmap will provide a framework for California’s economic recovery that recognizes global and statewide shifts in key industries and regional economies likely to result from a transition to carbon neutrality.

To ensure a truly Just Transition requires an integrated approach to labor, workforce, and economic policy that prioritizes job quality as a key pathway to both equity and competitiveness. That means transitions must focus both on communities and workers that rely heavily on fossil fuel or other traditional industries, and on creating economic opportunity for disadvantaged communities most burdened by the climate crisis.

OPR and LWDA are working across agencies in collaboration with a broad range of stakeholders to design the Roadmap. Although it will look different in every industry and region, the Roadmap will consistently build on five foundational elements:

- Diversifying the economy and creating or retaining high-quality jobs;
- Creating or expanding education and training pathways into those jobs;

⁸⁵ Robert Pollin et al., “Fact Sheet: Relief Programs for Displaced Oil & Gas Workers, from ‘A Program for Economic Recovery and Clean Energy Transition in California,’” CAClimateJobsPlan.com, accessed February 12, 2022, https://static1.squarespace.com/static/60b43a18079fdd42c6d01286/t/60bdc5bf6a007c14509e0887/1623049663256/LNS_Pollin+Fact+Sheets_Displaced+Worker_v2.pdf.

⁸⁶ Pollin et al., Chapter 6 in San Diego Regional Decarbonization Framework”; and Pollin et al., “Fact Sheet.”

- Planning the transition of specific industries (e.g., phased restructuring and redeployment)
- Creating and enhancing safety net programs for workers and communities; and
- Creating or expanding inclusive and diverse stakeholder processes to implement all of the above.⁸⁷

While the Roadmap has yet to be released, the administration is providing funding and support for stakeholder engagement processes for addressing aspects of Just Transition in specific regions. Two funding initiatives are especially relevant:

1. The [High Road Training Partnerships](#) (HRTTP) initiative supports industry partnership strategies that deliver equity, sustainability, and job quality. The industry-based, worker-focused training partnerships build skills for California’s “high-road” employers — firms that compete based on quality of product and service achieved through innovation and investment in human capital, and can thus generate family-supporting jobs where workers have agency and voice. A minority of grants in this initiative go to regional collaboratives to address planning for economic transition and diversification.
2. The [Community Economic Resilience Fund](#) (CERF) was created to promote a sustainable and equitable recovery from the economic distress of COVID-19 by supporting new plans and strategies to diversify local economies and develop sustainable industries that create high-quality, broadly accessible jobs for all Californians. Funding for CERF totals \$600 million for the state, divided into 13 regions including the San Diego and Imperial counties region. Applications have not yet been released.

The three regions that will be most affected are Kern County, the seat of oil extraction for the state, with extreme dependence on oil extraction for jobs and the local tax base; Los Angeles County, which has both extraction and refining, but both are small in scale within the vast diversified economy of Los Angeles; and Contra Costa County, seat of five refineries in the East Bay, and which falls between Los Angeles and Kern with regard to regional dependence on fossil fuel jobs and economic activity. Below, we briefly summarize the on-going processes in each of these three regions.

Recent Just Transition Stakeholder Engagement Processes in other Localities in California

Contra Costa Transition Program

Funded as a regional HRTTP, this strategy has been launched outside government processes, as a grassroots effort to bring together refinery workers, their unions, the refinery-impacted community, allies, and high-road industry stakeholders to develop a shared vision of a regional managed refinery transition, alternative economic development pathways in the low carbon economy, and durable and deep frontline partnership in Contra Costa County. This effort is being led by Blue Green Alliance and includes the United Steelworkers (USW), a union that represents Contra Costa County refinery employees, the Asian Pacific Environmental Network (APEN) and will over time bring in other unions and community partners. The project is engaging researchers to provide information and analysis needed to envision economic diversification pathways in Contra Costa County that both connect dislocated workers to services/parallel career pathways, and also leverage family sustaining, safe, and highly skilled job ladders for workers from

⁸⁷ Excerpted from “California’s Just Transition Roadmap,” California Governor’s Office of Planning and Research (OPR), accessed February 11, 2022, <https://opr.ca.gov/economic-development/just-transition/roadmap.html>.

low-income communities of color typically excluded from benefits of the fossil economy. It plans to work with local government and state government to augment ongoing planning and political processes.

Los Angeles City-County Just Transition Task Force

Los Angeles County has embarked on a stakeholder process to transition away from oil well drilling and eventually all fossil fuel activity in the region. The motion [*Developing a Comprehensive Strategy for a Just Transition Away from Fossil Fuels in Los Angeles County*](#) passed the County Board of Supervisors in September of 2021, and directed the County to develop a comprehensive strategy for a just transition away from fossil fuels, to begin with reconvening and expanding the Just Transition Taskforce. Given the shared decarbonization and high-road workforce goals of the County and City of Los Angeles, as reflected in the climate action plan of each, the County and City are jointly reconvening the Just Transition Taskforce. This Taskforce will help guide the development of this strategy and provide actionable recommendations on how to mitigate the burden of dislocation that will be the consequence of the region's efforts to eliminate oil drilling. The Taskforce includes environmental groups, frontline community organizations, and labor unions and will be facilitated by the non-profit organization [*Just Transition Fund*](#). The issues it is tackling include addressing the needs of and displaced workers, environmental remediation and reuse of oil well sites. This is a government led process with deep stakeholder involvement in building consensus around recommendations for action.⁸⁸

Kern County Regional Workforce Strategy

A collaboration of public agencies and community stakeholders have been funded by the H RTP initiative to address economic diversification and quality jobs in Kern County. As noted on the [*H RTP website*](#):⁸⁹

The Regional Workforce Strategy project in Kern County brings together a coalition of key stakeholders, including those often excluded or under-valued in economic development planning and workforce training opportunities, to develop a community- and worker-centered Strategic Workforce Development Plan. Sector and cross-sector work groups will engage community members, experts, workers, and industry leaders to assess training needs and identify opportunities to develop a high road workforce. The project consists of three major areas of work: 1) industry and workforce research, 2) coalition-building to deepen regional collaboration, and 3) identification, implementation, and expansion of high road training.

This project is just starting out and has yet to identify specific strategies to address the contraction of oil and gas extraction in the county.

Thus far in this chapter, we have set out the principles of Just Transition and the issues that must be addressed. These include 1) redeploying displaced workers in existing or new industries at comparable compensation levels, 2) robust support for retraining for those able and interested in pursuing alternative careers, and 3) providing a safety net, pension guarantees and bridges to retirement for workers unable to be redeployed for a variety of reasons such as age, skill portfolio, relocation barriers, etc. We have also outlined a process for engaging stakeholders across the region. We now turn to the matter of job loss, first addressing the specific risks of job loss in the San Diego region, and then focusing on redeployment possibilities for these specific workers, laying out recommendations for supporting affected workers and diversifying the regional economy over the long term.

⁸⁸ County of Los Angeles Chief Sustainability Office (CSO), email to authors, February 10, 2022, "Los Angeles City-County Just Transition Task Force."

⁸⁹ Excerpted from "High Road to Regional Workforce Strategies: Kern County," California Workforce Development Board (CWDB), accessed February 11, 2022, https://cwdb.ca.gov/wp-content/uploads/sites/43/2021/04/2021.H RTP_.Kern_ACCESSIBLE.pdf.

Addressing Job Loss: Risks of Worker Displacement

The RDF projects that as San Diego’s regional decarbonization proceeds, employment will begin to contract in fossil fuel sectors after 2030. It establishes a baseline of 9,239 fossil fuel workers (direct jobs, RDF Table 13) in San Diego County as of 2018, the large majority of which are employed in natural gas (70% in natural gas distribution alone). In addressing the risks of job loss due to regional decarbonization, these direct jobs in fossil fuel sectors will be our focus. Labor researchers recommend that just transition programs focus on supporting “workers facing displacement through the direct jobs channel,” for whom this support will be most needed and also where it will have the most impact. Guaranteeing these workers’ level of compensation in turn protects the regional economy against reduced spending (and thus induced and indirect jobs loss) that would occur if they experienced loss of income. “It follows that implementing the just transition program will mean that there will also be no reverse induced employment effects in California even as the fossil fuel-based industries themselves contract.”⁹⁰

As demand for natural gas declines in the San Diego region, employment in this sector will eventually contract: the RDF assumes an employment contraction rate of -75% in the county’s natural gas sector by 2050, concentrated after the year 2030 (RDF, Table 12). While the RDF models overall net job creation from the region’s decarbonization, the critical issue is ensuring that the actual workers affected remain securely employed at comparable skill and compensation levels. This requires careful planning.

In the case of natural gas, the blue-collar jobs affected will be those of plumbers and pipefitters, but also electrical workers currently contracted by the utility (SDG&E) to do utility-related pipelaying work for natural gas, and Laborers involved in natural gas distribution, e.g., trench building and pipelaying for networks that bring gas from the plant to the place of use. The local labor unions representing workers in these trades are the following:

UA Local 230 (United Association of Plumbers, Steamfitters, Refrigeration & HVAC Service Technicians), representing 1,800 workers in the San Diego region, nearly all in San Diego County. Its members are roughly one-third pipefitters and two-thirds plumbers.

IBEW Local 465, representing 2,800 electrical workers in San Diego and Imperial Counties at locations including SDG&E, San Diego Transit, San Diego Trolley, Imperial Irrigation District, Davey Tree, Utility Tree Service and NRG.⁹¹

LUINA Local 89, representing 3,100 Laborers in San Diego County.

To the extent that the training and skill set of Laborers are not specialized for natural gas work and that demand for Laborers in a variety of construction projects can be expected to remain stable, our focus here is on the natural gas workers in UA Local 230 and IBEW Local 465.

Potential Areas for Redeployment of Natural Gas Workers

We identified two strategies that local governments in the San Diego region can use to re-employ laid off workers as the region transitions away from natural gas. With planning and intention, new economic development projects as well as intentional policies to contract with high road employers for on-going

⁹⁰ See Section 6. Robert Pollin et al., “A Program for Economic Recovery and Clean Energy Transition in California” (Department of Economics and Political Economy Research Institute (PERI), University of Massachusetts-Amherst, June 2021).

⁹¹ “IBEW Local 465 | Facebook,” accessed December 20, 2021, <https://www.facebook.com/ibew465/>.

public workers projects can both result in re-employment of union workers, at comparable wages and benefits, who are at risk of job loss.

Infrastructure Investments New Green Economic Development Projects

The following are potential economic development opportunities that could both contribute to San Diego's climate and environmental goals, and largely eliminate the need for just transition safety net investments by absorbing displaced natural gas workers. This would allow them to remain in their labor unions and be re-employed at comparable compensation rates, utilizing the high-level training they already have. Multiple state and federal funding opportunities exist, such as the [Community Economic Resilience Fund](#) (CERF), that could assist in the development of these projects and strong engagement of community and labor stakeholders. CERF also places a strong emphasis on interregional cooperation. California counties have been broken down into thirteen "CERF Regions," with San Diego and Imperial Counties together forming the Southern Border Region. CERF planning grants will allow flexible economic analysis at various geographic scales, including economic flows between different regions and implementation grants that will allow for projects that cross regional boundaries.⁹² Securing state and federal funding requires proactive planning by various levels of local government.

- **Waste-to-Energy (W2E)**

The waste-to-energy process—by which waste itself (food, used oils, biomass, etc.) or waste processing (e.g., methane emissions) is used to produce energy or combustible fuel—holds significant potential for circular economy projects, serving both climate and workforce goals.

Successful W2E / circular economy models in [Oakland](#) (renewable diesel from waste),⁹³ [San Francisco](#) (sustainable jet fuel from waste), [Lancaster](#) (green hydrogen from waste), and [other cities](#) across the country, have demonstrated not only the climate benefits and economic viability of these projects, but their effectiveness in re-employing former fossil fuel workers.

In July 2020, Neste, the world's largest producer of renewable diesel and jet fuel, began delivering sustainable aviation fuel (SAF) to San Francisco International Airport (SFO) via an existing multi-product pipeline infrastructure. This growing initiative aims to make SFO a hub for the distribution of SAF made from 100% renewable waste and residue.^{94, 95} Labor representatives indicate that the plant is already providing employment for UA workers transitioning away from natural gas jobs.⁹⁶

In the San Diego region, methane emissions from landfills (particularly Miramar, but also Santee, etc.) are a significant source of pollution, which, if captured and turned into energy, also represents a renewable raw material. Curbing the emissions generated by the county's waste is an opportunity to lower regional greenhouse gas emissions, and W2E offers a means of doing this that creates valuable sustainable energy

⁹² "Community Economic Resilience Fund (CERF)," California Governor's Office of Planning and Research, accessed January 17, 2022, <https://opr.ca.gov/economic-development/just-transition/cerf.html>.

⁹³ A circular economy turning local waste into renewable diesel could provide fuel for any diesel vehicles or equipment (garbage trucks, etc.) continuing to operate in the county fleet as it gradually switches to electric vehicles, offering a lower-carbon means of allowing diesel vehicles to reach the end of their useful lives.

⁹⁴ "Neste Delivers Sustainable Aviation Fuel to San Francisco International Airport – First Company to Deliver It via Pipeline," Neste worldwide, July 7, 2020, <https://www.neste.com/releases-and-news/aviation/neste-delivers-sustainable-aviation-fuel-san-francisco-international-airport-first-company-deliver>.

⁹⁵ "Renewable Waste and Residue Raw Materials | Neste," Neste, accessed January 3, 2022, <https://www.neste.com/products/all-products/aviation/raw-materials#b2ee0542>.

⁹⁶ Labor representative, United Association Local 230.

and supports good jobs. UA Local 230 estimates that the creation of a W2E plant represents around 600 construction jobs (short-term) and some 30 to 35 permanent plumber/pipefitter positions for the operation of the plant.⁹⁷

Funding for the construction of a W2E plant in the San Diego region could come from various sources including federal and state funding: the CERF and several federal funding sources. These funding sources explicitly recognize the importance of job quality and of the participation of community and union stakeholders.⁹⁸

W2E may hold significant potential for the San Diego region as a means of supporting good jobs for displaced fossil fuel workers, while simultaneously advancing climate goals by reducing waste and emissions from waste, and possibly repurposing natural gas infrastructure (peaker plants, pipelines, etc.) for sustainable, low-carbon fuel and energy operations. There appear to be opportunities for funding, and existing W2E projects demonstrate the interest of industry partners and replicable best practices. As a next step, a feasibility study is recommended to assess the extent to which W2E can be effective in the San Diego region, and which type of W2E operation(s) would be the best fit.

- **District Thermal Energy:**⁹⁹

District energy is a promising sector for high-quality job opportunities for skilled and trained workers, including those in the gas utility and construction fields. It can also be a new line of business for utilities impacted by declining demand for gas, positioning them as a provider of energy rather than fuel.

District energy harnesses the fact that buildings themselves can be sources of useful energy, and sinks for waste energy. Unlike traditional energy networks (both gas and electric), which do not incorporate buildings in this way, district energy systems interconnect buildings with complementary heating and cooling needs, so that, for example, waste heat for one building can be used as source heat for another. In addition to climate benefits, this approach can enhance energy system reliability and resiliency, improve energy efficiency, and reduce costs.

District energy systems are practical for a wide range of buildings, including in retrofit situations. Whether a district energy system connects two buildings (as at the Amazon headquarters in Seattle) or several hundred (as on the Stanford campus), this system is best-suited to developments with:

- A diversity of building uses, where heating and cooling loads can be balanced across the connected system as a whole;

⁹⁷ Labor representative, United Association Local 230.

⁹⁸ It has also been suggested that the cost of this type of project could be offset by a repeal of the People's Ordinance of 1919, under which many City of San Diego residents receive free trash pickup and disposal, at a cost of \$43.2 million in taxpayer dollars in 2021. Proponents of current efforts to repeal, spearheaded by Councilmember Sean Elo-Rivera, argue that the law is unfair and fiscally irresponsible, and that the extra money could be used to accelerate climate actions. See: Elo-Rivera, "The People's Ordinance Is Irresponsible and Unfair," SDNews.com, http://www.sdnews.com/view/full_story/27825145/article-The-People-s-Ordinance-is-irresponsible-and-unfair?mobile_view=false; and David Garrick, "Unions, Environmental Groups Endorse Proposal to Repeal San Diego's Free Trash Pick-up Law," *San Diego Union-Tribune*, October 8, 2021, sec. Politics, <https://www.sandiegouniontribune.com/news/politics/story/2021-10-07/unions-environmental-groups-endorse-proposal-to-repeal-san-diegos-free-trash-pick-up-law>.

⁹⁹ This section on District Thermal Energy is adapted from Betony Jones, "Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities."

- High load and density of buildings, where short distances of distribution piping can interconnect multiple buildings of scale, such as airports, large hospital, office, and industrial complexes, college and university campuses, sports stadiums, etc.;
- High capital costs, such as new developments where extending infrastructure for gas is costly and otherwise undesirable; and
- The ability to finance investment with a long payback and depreciation schedules, such as government facilities, hospital complexes, airports, utilities, and college and university campuses.

EXAMPLE:

- [Stanford University](#)'s transformation of the campus district energy system employed 72 different signatory subcontractors and created union jobs across the skilled construction trades, including jobs for pipefitters, insulators, boilermakers, and others.¹⁰⁰

- **Lithium Valley**¹⁰¹

Imperial Valley has an enormous reserve of yet-untapped lithium in geothermal brines that are the by-product of geothermal renewable energy development. There is much interest by the state and federal governments as well as private sector developers in pioneering new, environmentally sound technologies that can coproduce lithium with renewable electricity from new and existing geothermal power plants in the Imperial Valley. This represents an opportunity for the region to be a major producer of lithium for the state, national and global market and expand geothermal renewable energy at the same time. It also offers the opportunity, with support and intervention by state and federal governments, to co-locate significant parts of the supply chain, such as further processing of lithium and cell and battery manufacturing, which are essential both for the electrification of transportation and for utility scale battery storage. The development of geothermal energy will be accelerated by the California Public Utilities Commission's (CPUC's) June 2021 decision to procure, by 2026 at least 1,000 MW of electricity resources coming from "firm resources with zero-onsite emissions" such as geothermal.¹⁰² The state and the federal governments are also very likely to encourage landing other parts of the supply chain in the region, with various forms of assistance and subsidies, which will further create jobs. Pollin estimates 8,100 jobs from 2021 to 2030 (810 jobs per year), some of which could be filled with former gas workers in both Imperial and San Diego counties.¹⁰³

- **Onsite Water Reuse**

Onsite water reuse is increasingly prevalent as a means to improve water efficiency and help counter water scarcity. "Climate change will require much more efficient use of water, and one of the ways to do this is to construct buildings so that reclaimed water can be used for certain purposes. Dual piping requirements

¹⁰⁰ Betony Jones, "Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities."

¹⁰¹ This section is based on Ken Alston et al., "Building Lithium Valley: Opportunities and Challenges Ahead for Developing California's Battery Manufacturing Ecosystem" (New Energy Nexus, September 2020), https://www.newenergynexus.com/wp-content/uploads/2020/10/New-Energy-Nexus_Building-Lithium-Valley.pdf.

¹⁰² Michael W. Kelley, Imperial County Board of Supervisors, "Imperial County Letter to CPUC," June 10, 2021, <https://efiling.energy.ca.gov>.

¹⁰³ Pollen et al., "Supplemental Note" in Chapter 6, "San Diego Regional Decarbonization Framework."

would allow the city to supply both potable and reclaimed water to a home or business, using separate water piping systems to prevent mixing of the two water supplies.”¹⁰⁴

Requiring or encouraging water reuse for buildings creates demand for skilled labor in this emerging market, particularly for pipefitters and plumbers. In all-electric or other gas-free, low-carbon new construction, this approach can substitute for the loss of gas work, while ensuring that buildings will remain functional in a more water-constrained future.

Certification requirements for plumbers in onsite water reuse projects can ensure the vigorous water quality standards essential to the safety of reclaimed water, and can be built upon the robust training the journey level plumbers receive through their state-certified apprenticeship programs. Absent statewide licensing requirements in this area, local or regional skill standards can secure this area of employment for local skilled plumbers, protecting both job quality and water quality in the high-stakes and high-potential water reuse sector.¹⁰⁵

On-going Public Works

In addition to these new areas of green economic development, local governments also have the opportunity to redeploy displaced gas workers on current and on-going public work investments. Funding opportunities include the federal [American Rescue Plan Act](#) (ARPA), which lists water, sewer and other infrastructure investments as an eligible use for funding.¹⁰⁶

- **Water and Sewer Upgrades**

Upgrades to stormwater and sewer systems are another activity into which plumbers and pipefitters previously working in natural gas can transition, as the foundational skills and knowledge for both activities are similar. Currently, the large majority of stormwater work contracts awarded by the City of San Diego go to non-union contractors, according to the UA Local 230.¹⁰⁷ A commitment by local government to award these contracts to union workers would open up this existing sector to UA plumbers and pipefitters transitioning out of the natural gas sector, while ensuring that the taxpayer dollars funding this work is supporting high-quality, family-sustaining jobs. The most effective means of achieving this would be with a Project Labor Agreement (PLA) or Community Workforce Agreement (CWA).

- **Publicly Funded Capital Projects in the San Diego region**

Deploy appropriate labor and skill standards across all county capital projects.

¹⁰⁴ Betony Jones, “Los Angeles Building Decarbonization: Community Concerns, Employment Impacts, and Opportunities.”

¹⁰⁵ Labor representative, United Association Local 230.

¹⁰⁶ “American Rescue Plan Spending: Recommended Guiding Principles,” accessed February 13, 2022, <https://www.gfoa.org/american-rescue-plan-spending-guiding-principles>.

¹⁰⁷ Labor representative, United Association Local 230.

Recommendations for a Just Transition

Our recommendations for a robust Just Transition program to address worker displacement center on the following principles:

1. Convene an interagency and stakeholder task force.

This task force should develop the most likely job disruption scenarios through 2050 and, for each scenario, a transition plan including cost estimates¹⁰⁸ for a variety of assistance packages, options for retraining and relocation. These scenarios and plans should take into account all relevant parameters, such as the rate of industry transition, worker age throughout the workforce in question, the existence and quality of pension plans, etc.¹⁰⁹

2. Chart concrete short- and long-term transition plans.

These plans should include a region-wide industrial strategy and forward-looking economic diversification strategy that are compatible with and supportive of job quality and a decarbonized economy. For example, the low-carbon sectors we have identified above may hold promise for the redeployment of fossil fuel workers in the San Diego region. There are near-term state and federal funding opportunities for economic development projects that meet high-road criteria. Economic development planners should explore these options with an eye to providing opportunities to redeploy the County's gas workers, and submit proposals for those that are deemed feasible and beneficial for the region.

3. Create a stakeholder engagement process with the San Diego region's labor and community partners.

These strategic partners should be at the table every step of the way to help develop the region's climate policies, to ensure they benefit workers and that appropriate plans are in place to protect against any potential negative impacts. Proposals submitted to state and federal economic development programs should include the relevant unions or labor councils as partners. The Los Angeles Just Transition task force provides the most relevant model, as it is convened and staffed by local government and includes robust participation by stakeholders.

4. Avoid abrupt layoffs and minimize industry destabilization.

This includes exploring alternatives to plant closures or activity stoppage that would lead to layoffs when targeted investments in emissions abatement and enforcement of pollution mandates can reduce emissions with maximum job retention, and in some cases even job creation. Where lay-offs may occur in regulated utilities or in power plants under the regulatory authority of the California Public Utilities Commission (CPUC), leverage this authority for long term closure plans, such as is occurring for the closure of the Diablo Canyon nuclear facility on the Central Coast.

¹⁰⁸ Researchers at the Political Economy Research Institute (PERI, University of Massachusetts) led by Dr. Robert Pollin have done cost analyses of just transition programs in several California counties (Kern, Contra Costa, Los Angeles). This methodology may be of use in conducting cost analyses of just transition programs in San Diego County. See Section 6 in Pollin et al., "A Program for Economic Recovery and Clean Energy Transition in California."

¹⁰⁹ J. Mijin Cha, "Chapter 4: Just Transition" in Zabin et al., "Putting California on the High Road: A Jobs and Climate Action Plan for 2030."

5. Mitigate job loss by packaging policies together.

When climate policy is expected to lead to job loss, attempt to pair this with another policy where job creation will offset the anticipated loss.

6. Make sure layoffs that do occur are planned for and coordinated to ensure continuity of workers' employment and economic security.

Engage in advance planning to secure pensions and support bridges to retirement, wage insurance, and other safeguards for workers, according to their individual situation. Implement economic development projects that can redeploy laid off workers at comparable wages and benefits. Provide robust job training and job placement supports for laid off workers who wish to change careers.

9 Next Steps

- Develop a technical assistance team, perhaps at the regional level to help local agencies and authorities implementing decarbonization policies identify and incorporate the labor standards and labor policy levers identified in this report.
- Convene a just transition task force that includes affected stakeholders, considering hiring an outside facilitator as in Los Angeles.
- Carry out research to identify likely timing of gas industry contraction, identify redeployment possibilities, and safety net and retraining needs of gas workers
- Convene appropriate partners to assess the feasibility of the identified industrial climate infrastructure investments that can redeploy gas workers strategies, and to apply for state and federal funding with labor and community partners to support these developments, and plan for their phase-in as gas work contracts.
- Develop a plan to fund and build infrastructure for safety net and retraining if redeployment of gas workers is not universal.
- Assess need to shore up pre-apprenticeship via HRCC funding, and develop industry training partnerships, via HRTF funding

10 Conclusion

Bold action is the necessary response to the urgency of the climate crisis, but such action must be coupled with intentional social policies and strategic capital investments to ensure the effects on the region's workers are positive. Without incorporating workforce goals into climate policy, the transition to a carbon-neutral economy may accelerate and exacerbate the growth of low-wage jobs, particularly in blue-collar occupations, which make up the majority of climate-related jobs. Low-wage jobs hurt the local economy and hamper climate action. In contrast, high-road jobs are a win-win approach for employers and community: employers gain access to skilled and committed workers, and community members gain access to good careers.

Labor standards, job access programs, and infrastructure investments can together ensure that the job impacts of the region's decarbonization actions are positive. Even though decarbonization is projected to grow net jobs in the region, early planning for a just transition will ensure that specific workers facing job loss are not left to fend for themselves.

By adopting and implementing the recommendations and principles set forth in this report, the San Diego region can ensure a high-road transition to a carbon-neutral local economy. In upholding and expanding high-wage, high-skill jobs, the region will be able to retain and expand the qualified workforce necessary to implement the most beneficial emission-reducing technologies of today and tomorrow. Decarbonization work will be done efficiently and effectively. New workers will have access to career-track training and family-sustaining employment. The region will realize all of the benefits of climate action: lower energy costs, increased access to clean energy, safer and healthier homes, more livable communities, reduced pollution, and expanded economic opportunity. In pursuing the high road to decarbonization, the San Diego region will set a high bar for communities across the country. In achieving these high-road outcomes, the region will set a new standard.

Appendices

Appendix A. Data on Job Quality and Occupational Breakdowns

A high-road approach to regional decarbonization seeks at minimum to protect and, wherever possible, to improve upon existing workforce conditions, particularly in the service of greater equity and inclusion. The data referred to or included in this Appendix helps establish a baseline for job quality and job access in the economic sectors involved in and affected by decarbonization in the San Diego region. It also helps define and characterize the occupations in the sectors involved, including the percentage of blue-collar jobs in each industry (see **Exhibit A** below).

In their analysis of employment impacts (Chapter 6), the RDF researchers have provided quantitative data on prevalent job types and occupational breakdowns, as well as indicators of job quality (see RDF Chapter 6, **Tables 6 - 15**). This data indicates health insurance coverage and union membership rates, education levels, BIPOC and female worker percentages in key industries, as well as 25th, 50th, and 75th wage percentiles. In considering wage as an indicator of job quality, it is important to use wage percentiles such as these (20-50-75) rather than average compensation or mean wage data alone, which can fail to capture the range and extent of wage disparity within a single job category.

The following table lists the percentage of blue-collar employment in key industries, labeled according to the North American Industry Classification System (NAICS).

Exhibit A. Scoping Plan Sector, Subsector, Industry, and Percent Blue-Collar Employment¹¹⁰

Scoping Plan Sector	Subsector	Industry by NAICS	% Blue-Collar Jobs
Energy	Utility Scale Renewables - Construction	Utility System Construction	78%
	Utility Scale Renewables - Operations	Electric Power Generation, Transmission and Distribution	38%
	Distributed Generation	Residential Building Construction	69%
		Nonresidential Building Construction	59%
	Energy Efficiency	Residential Building Construction	69%
		Nonresidential Building Construction	59%
	Natural Gas Leakage Abatement	Natural Gas Distribution*	42%

¹¹⁰ Excerpted from Carol Zabin et al., Exhibit A.2 in “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

Transportation	Cleaner Vehicles	Motor Vehicle Manufacturing	87%
		Automotive Repair and Maintenance	78%
	Trucking	Truck Transportation	77%
	Public Transit	Transit and Ground Passenger Transportation	83%
	Clean Fuel Infrastructure	Electrical Contractors and Other Wiring Installation	75%
	Transit Infrastructure	Other Heavy and Civil Engineering Construction	76%
	Infill and Transit-Oriented Development	Residential Building Construction	69%
		Nonresidential Building Construction	59%
Industry	Emissions Intensive Manufacturing	Various*	58%**
	Fossil Fuel Production, Refining, and Distribution	Oil and Gas Extraction	41%
		Petroleum and Coal Products Manufacturing	55%
		Pipeline Transportation	63%
	Emissions and Leakage Abatement	Other Specialty Contractors	79%
	Electrification	Electrical Contractors and Other Wiring Installation	75%
Waste	Waste Diversion and Methane Capture	Waste Management and Remediation Services	76%
Water	Water Conservation in Drinking Water, Storm Water, Waste Water, Efficient Water Infrastructure	Water, Sewage and Other Systems	58%
		Utility System Construction	78%
		Remediation and Other Waste Management Services	72%
Natural and Working Lands	Forestry Services, Fire Prevention and Suppression	Forestry and Logging	90%
	Lower Carbon Soil Management and Crop Production; Manure Management for Methane Capture	Agriculture, Forestry, Fishing and Hunting	96%
	Wetlands Restoration, Urban Greening, etc.	Various*	N/A

Notes:

* Detailed occupation profile of this industry is not available.

** Employment-weighted average of proportions of blue-collar workers within the NAICS industries listed as eligible for receiving allowances under the Cap-and-Trade Program Vintage 2018 Allowance Allocation. See California Air Resources Board, “Cap-and-Trade Program: Vintage 2018 Allowance Allocation,” December 5, 2017, <https://ww3.arb.ca.gov/cc/capandtrade/allowanceallocation/v2018allocation.pdf>.

Source: May 2016 OES Research Estimates by State and Industry [https://www.bls.gov/oes/current/oes_research_estimates.htm].

Exhibit B. National Worker Unionization Rates in Energy Sectors¹¹¹

Sector	Percentage of Union Workers
National Workforce Average (All Sectors)	6%
Fuels	3%
Petroleum Fuels	2%
Coal Fuels	1%
Natural Gas Fuels	3%
Nuclear Fuels -T9	6%
Corn Ethanol Fuels	7%
Other Ethanol and Non-Woody Biomass Fuels (Including Biodiesel)	4%
Woody Biomass Fuel for Energy and Cellulosic Biofuel T-12	8%
Other Fuels	9%
Electric Power Generation	7%
Solar Power Generation	4%
Wind Electric Power Generation	6%
Combined Heat and Power Generation	9%
Hydroelectric Power Generation	7%

¹¹¹ From “2020 U.S. Energy and Employment Report (USEER)” (Energy Futures Initiatives (EFI); National Association of State Energy Officials (NASEO), 2020), <https://www.usenergyjobs.org/>; based on private-sector union membership data from “Table 3: Union affiliation of employed wage and salary workers by occupation and industry, 2018-19 annual averages,” in U.S. Department of Labor, Bureau of Labor Statistics, “Union Members Summary,” news release, January 22, 2020, <https://www.bls.gov/news.release/union2.nr0.htm>.

Coal Electric Power Generation	10%
Natural Gas Electric Power Generation	11%
Nuclear Electric Power Generation	12%
Oil Electric Power Generation	4%
Biomass Electric Power Generation	10%
Other Electric Power Generation	4%
Transmission, Distribution & Storage	17%
Energy Efficiency	10%
Motor Vehicles & Component Parts	13%

Appendix B. Demand-Side Workforce Policy Levers: Establishing the Market Conditions to Attract and Retain Skilled Workers

This section is a largely excerpted from Chapter 2 of the state High-Road Plan,¹¹² with adaptations as applicable to the San Diego region:

Climate policy creates both disruptions and new opportunities for businesses in the San Diego region and for the workers they employ. Minimizing the disruptions and maximizing shared prosperity as new opportunities arise requires specific and intentional labor policy.

A low-carbon economy with broadly shared benefits will not happen automatically. Not all jobs that are commonly considered “green jobs” are good jobs nor are they automatically accessible to workers from disadvantaged communities. The good news is that there are feasible, road-tested policy mechanisms that are complementary to and can be carried out in conjunction with climate policy. These mechanisms can be utilized to promote the generation of good jobs and pipelines into them for workers from historically excluded groups and communities.

The following section presents an inventory of labor standards and other good jobs strategies that are high impact and feasible. When attached to appropriate climate measures, these workforce policies can be used as levers to improve job quality and access and ensure that workers with appropriate skills are engaged in the critical work of building a carbon neutral economy. These demand-side policies can be incorporated into climate measures through a variety of authorizing mechanisms, including legislation, executive orders, agency regulations, and agreements among private parties that can sometimes be encouraged by local government. They provide concrete ways to promote a high-road economy, in which employers pay family-supporting wages and compete based on the quality of their services and products.¹¹³

Labor standards and other demand-side workforce policies raise wages but do not necessarily raise total costs of production. As discussed in more detail at the end of the chapter, studies have found that benefits generally outweigh or at least equal costs. This favorable balance is because higher wages, better training, and safer workplaces lead to increased workforce productivity and performance. Proper installation and maintenance depend on high performance, not only for professional workers, but also for blue-collar workers, as has been well documented in energy efficiency innovations such as advanced HVAC and lighting controls.¹¹⁴

This chapter explains the role of labor standards in general, and then in terms of specific policy levers. Some of these apply only to the construction industry, which has a uniquely well-developed set of high road standards codified in federal and state labor code.

¹¹² Carol Zabin and Jenifer MacGillvary, “Chapter 2: Demand-Side Workforce Policy Levers,” in Carol Zabin et al. “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

¹¹³ Laura Dresser and Sarah White, “CWDB Equity, Climate & Job Series” (California Workforce Development Board, 2018).

¹¹⁴ Carol Zabin, Ph.D., Jessica Halpern-Finnerty, and Megan Emiko Scott, “Workforce Issues and Energy Efficiency Programs: A Plan for California’s Utilities” (Donald Vial Center on Employment in the Green Economy, UC Berkeley, May 2014), <http://laborcenter.berkeley.edu/pdf/2014/WET-Plan14.pdf>.

What Are Labor Standards and Related Workforce Policy Levers?

The demand-side policy levers discussed in this report can be organized into four general categories:

Labor Standards

Labor standards include compensation standards (such as minimum wages, living wages, prevailing wages, and requirements to provide health insurance), workplace safety standards, and any other requirement intended primarily to improve conditions for workers, including such things as fair scheduling rules, sick leave, union neutrality, and whistleblower protections. The establishment and enforcement of strict labor standards and worker protections comprises one type of workforce policy lever.

Labor standards can be economy-wide, such as minimum wages, or specific to an industry or set of employers, such as prevailing wages for the construction industry or living wages for government contractors.

Skill Standards

A second type of policy lever focuses on worker qualifications and is intended primarily to ensure high-quality work products. Specific policy levers to this end include skill standards such as requirements for licensing, skills certifications, educational credential, and similar requirements for employees.

Access Policies

Another type of workforce policy lever is concerned with inclusion, diversity, and local community benefits. Here, specific policies include requirements to increase hiring from historically marginalized communities and/or local hiring.

Comprehensive Strategies

Individual policy levers are often combined into a comprehensive “umbrella” policy lever. These can include both wage and benefit standards and goals or agreements concerning inclusion in hiring. Project Labor Agreements (PLAs) are the most common of these umbrella policies in large, complex construction projects. Community workforce agreements (CWAs) and community benefits agreements (CBAs), for example, can include wage and skill standards as well as local or targeted hire goals. Responsible contractor requirements often embed labor and skill requirements along with other minimum insurance and performance standards. In so doing, these policies support high-road employers who compete on quality; focus on innovation, productivity, and value added; use well-paid workers as a force for greater production; and focus on the long-term prospects of the firm.

These standards and policies can and should be harnessed to San Diego’s visionary climate agenda. Various mechanisms can be used to attach labor standards to climate measures. They can be mandated in legislation, in regulation, as a condition of participation in incentive programs, in competitive solicitations and procurement policies, and through a variety of other authorizing vehicles. The following paragraphs describe specific workforce policy mechanisms targeting the goals of one or more of the above categories.

1. Wage and Benefit Standards

A. Prevailing Wages (Construction Sector)

California’s prevailing wage laws, like the federal government’s Davis-Bacon Act, require that on public works projects, contractors and subcontractors must pay their workers not less than the wage rates and health and pension benefits “prevailing” in the local areas, based on the classification or type of work

performed by each worker. Under California law, minimum labor standard requirements apply to apprentices in state-certified apprenticeship programs; apprentice wage rates rise as workers progress in their program.

The purpose of prevailing wage laws is to ensure that public investments do not undermine local wages and do not provide an incentive for employers to recruit lower-wage workers from outside the area. Prevailing wage laws also level the playing field in the bidding process for contractors that pay union-scale wages and benefits.

Examples in Low-Carbon Sectors: High-speed rail; all construction projects for public transit agencies financed by the GGRF; and Proposition 39 of 2012, which provides state funding (\$431.4 million in 2017-18) to support energy efficiency projects in K–12 schools.

LOCAL EXAMPLE:

- In February 2022, the San Diego County Board of Supervisors voted to approve the Working Families Ordinance, a key provision of which requires the use of “a skilled and trained workforce ... in the completion of any construction project on County-owned property valued over \$1,000,000, or over \$25,000 where all of the work is performed by an apprenticeable occupation.” Slated for adoption on March 1, 2022, the Working Families Ordinance also establishes a wage floor for construction on county land, including County-owned leased land such as airport and agricultural lands; and makes mandatory a requirement that “prospective bidders prequalify for any public works project.”¹¹⁵

Authorizing Vehicles: Prevailing wage exists in state law and covers construction projects that are paid for in full or in part out of public funds. The prevailing wage requirement has recently been extended to cover certain private projects for which developers seek streamlined environmental review (see, e.g., Senate Bill 35 [Wiener, Chapter 366, Statutes of 2017]¹¹⁶). Prevailing wage requirements have also been mandated in power purchase agreements between both investor-owned and public utilities and power plant developers.

¹¹⁷

B. Wage Floors for Occupations Not Covered by Prevailing Wage

A variety of wage standards exist in industries not covered by prevailing wage laws. The state has the authority to set wage floors in programs they operate.

Examples in Low-Carbon Sectors: The Utility Pre-Craft Trainee (UPCT) program, an innovative low-income weatherization program operated by the Los Angeles Department of Water and Power (LADWP), created a wage floor for its workers.¹¹⁸ Started in 2011, the UPCT program trainees received a starting wage of \$16 per hour plus health and retirement benefits, as well as opportunities to move into careers in the skilled trades with the utility.

¹¹⁵ “Statement of Proceedings | County of San Diego Board of Supervisors Meeting of February 8, 2022,” 17.3 Action <https://www.sandiegocounty.gov/content/dam/sdc/bos/agenda/sop/02082022%20SOP.pdf>.

¹¹⁶ Scott Wiener, “SB-35: Planning and Zoning: Affordable Housing: Streamlined Approval Process,” Chapter 366, Statutes of 2017 § 65400, 65582.1 and 65913.4 (2017), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB35.

¹¹⁷ Los Angeles Department of Water and Power, “Competitive Offer Power Purchase Agreement Between City of Los Angeles Acting by and Through the Department of Water and Power and Hecate Energy Fit ‘A’ LLC,” June 3, 2014, http://clkrep.lacity.org/online/docs/2014/14-0736_misc_a_06-05-14.pdf.

¹¹⁸ Megan Emiko Scott and Carol Zabin, “Training for the Future II: Los Angeles’s Utility Pre-Craft Trainee Program: Progress to Date” (UC Berkeley Donald Vial Center on Employment in the Green Economy, May 2016), <http://laborcenter.berkeley.edu/training-for-the-future-ii/>.

Authorizing Vehicles: Wage mandates and other compensation standards can be enacted in state law, regulation, public investment and procurement policies, and incentives programs as a condition of participation.

2. Skill Standards

Skill certifications, educational credentials, licenses, and other skill standards for specific occupations or tasks comprise a second type of labor standard. “Industry-recognized” skill certifications demonstrate a worker’s competence and value to their employer and usually command higher wages. When skill certifications are required or expected as a prerequisite for certain occupations or major tasks, it provides a signal to the training and education community about what skills are needed and valued in the labor market.

A. Requirements for a Skilled and Trained Workforce (Construction Sector)

In the construction industry, a journey card from a state-certified apprenticeship program qualifies as the most recognized and most robust skill certification for a particular skilled trade occupation. Apprenticeships are industry-funded, “earn-as-you-learn” programs that combine classroom instruction and paid on-the-job training over three to five years. Wages are increased in accordance with skills acquisition, and apprentices receive an industry-recognized credential when they complete the program.¹¹⁹ See Chapter 3 for a more detailed description of apprenticeship.

i. Requirements Under Public Works Labor Code

State law recognizes the importance of requiring the use of apprentices and graduates of apprenticeship as a means to ensure that a qualified workforce is employed on public works projects. Under the decades-old state public works labor code, contractors and subcontractors on all public works contracts valued at \$30,000 or more must utilize a specified ratio of apprentices from state-certified apprenticeship programs to journey-level workers, usually requiring one apprentice for every five journey workers.¹²⁰

ii. Requirements Under Skilled and Trained Workforce Standard

California has recently expanded apprenticeship requirements for a subset of public works projects¹²¹ as well as for some private-sector construction through the “skilled and trained workforce” requirement. This standard is stronger than that used in state public works law because it specifies: 1) that *all* workers in apprenticeable trades must meet certain standards; and 2) there must be an overall minimum percentage of journey-level workers on covered projects who have completed state-approved, registered apprenticeship programs.

¹¹⁹ State of California Department of Industrial Relations, “Public Works Apprentice Wage Sheets,” 2017, <https://www.dir.ca.gov/OPRL/pwappwage/PWAppWageStart.asp>.

¹²⁰ State of California Department of Industrial Relations, “Public Works Apprenticeship Requirements,” CA.gov, April 2017, <https://www.dir.ca.gov/das/publicworks.html>.

¹²¹ United Contractors, “Skilled and Trained Workforce Requirements: REVISED: Skilled and Trained Workforce Guide,” November 17, 2017, https://www.unitedcontractors.org/storage/documents/Contractor_Resource_Center/Master_Labor_Agreements/Skilled_and_Trained_Workforce_Guide_11.17.2017.pdf; Ben Hueso, “SB-693: Public Contracts: Skilled and Trained Workforce,” Education Code, Health and Safety Code, Public Contract Code § (2016), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB693.

The skilled and trained standard was established by Senate Bill 54 (Hancock, Chapter 366, Statutes of 2013),¹²² and applies to the workforce contracted by owners of petroleum refining and hydrocarbon manufacturing facilities to perform construction, repair, maintenance, and demolition work. It has also been incorporated in recent affordable housing bills, including SB 35 (Weiner, 2017) and Assembly Bill 73 (Chiu, Chapter 371, Statutes of 2017),¹²³ both of which create streamlined approval processes for some housing developments.¹²⁴

Examples in Low-Carbon Sectors: Under state prevailing wage law, all publicly funded clean energy projects—including Prop. 39 projects for clean energy upgrades and generation at public educational facilities,¹²⁵ high-speed rail construction, and other public works construction financed by the GGFR—must use the apprenticeship standard required in all public works construction above the \$30,000 threshold.

Authorizing Vehicles: Skill standards could be inserted in regulations, procurement policy, incentive programs, and mandates on regulated entities such as the Renewables Portfolio Standard (RPS).

B. Requirements for Specialized Certifications (Construction Sector)

Specialized certifications have been developed for specific clean technologies, particularly emerging technologies that require skill upgrades. These certifications are most effective when they augment a broad occupational credential rather than serving as stand-alone programs for specific “green skills.” A model program is the California Advanced Lighting Controls Training Program (CALCTP), a skills-upgrade certificate for licensed electricians. This third-party certification was developed as a collaboration of the UC Davis Lighting Center, the Lawrence Berkeley National Laboratory, the IOUs, the National Electrical Contractors Association (NECA), and the International Brotherhood of Electrical Workers (IBEW). These subject-matter experts and industry stakeholders developed the program to overcome skill gaps that were creating a major barrier to the successful adoption of technologies that have great promise to lower energy use from lighting. Similar programs have now been developed for electric vehicle charging infrastructure (EVITP), battery storage, and micro-grid installation.¹²⁶

Examples in Low-Carbon Sectors: Specialized skill certifications are required in a number of California low-carbon sectors, although to a much lesser extent than in Europe.

¹²² “Hancock. Hazardous Materials Management: Stationary Sources: Skilled and Trained Workforce,” Pub. L. No. 54, § 25536.7, Health and Safety Code (2013), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB54.

¹²³ David Chiu, “AB-73: Planning and Zoning: Housing Sustainability Districts,” Chapter 371, Statutes of 2017 § (2017), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB73.

¹²⁴ Scott Wiener, “SB-35: Planning and Zoning: Affordable Housing: Streamlined Approval Process,” Chapter 366, Statutes of 2017 § 65400, 65582.1 and 65913.4 (2017), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB35; David Chiu, “AB-73: Planning and Zoning: Housing Sustainability Districts,” Chapter 371, Statutes of 2017 § (2017), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB73.

¹²⁵ Carol Zabin, Kevin Duncan, and Erica Paul, “Proposition 39 Job Creation and Quality, 2014-2016, A Report to the Citizens Oversight Board of the California Clean Energy Jobs Act” (UC Berkeley Center for Labor Research and Education Green Economy Program, 2017), http://www.energy.ca.gov/efficiency/proposition39/citizens_oversight_board/documents/2016_reports/2016_Workforce_Development_Board_Jobs_Report.pdf.

¹²⁶ David Riley and Bernie Kotler, “Energy Storage and Microgrid Training and Certification (ESAM-TAC),” (October 8, 2017), https://www.necanet.org/docs/default-source/17presentations/e-35_energy-storage-and-microgrid-training-and-certification_riley_kotler_0900-0950_100817.pdf?sfvrsn=2.

EXAMPLE:

- The National Electrical Contractors Association and the International Brotherhood of Electrical Workers have developed a skill certification Electric Vehicle Infrastructure Training Program (EVITP), which is now integrated into electrician apprenticeship programs. EVITP certification is required for charging stations funded by state agencies such as the CEC, the CPUC and the CARB. In addition, the San Diego Metropolitan Transit District already requires EVITP-certified electricians for EV charging station infrastructure. This standard ensures both skills and family sustaining wages, and aligns with state certified apprenticeship programs for electricians.

To the extent that it increases demand for EVITP-certified electricians, transportation electrification adds new opportunities for participants in programs that create pathways into apprenticeship for historically marginalized populations. Since the EVITP is a journey-upgrade training program for the electrical trade, it expands opportunities for apprentices in the state-certified electrical apprenticeship programs. As more work is available, new apprenticeship slots can open up to provide entry for graduates of apprenticeship preparation programs. As work increases for EVITP-certified electricians, the pipeline into middle-class construction jobs also expands. As long as pre-apprenticeship programs are in place to help disadvantaged workers access and succeed in apprenticeship, inclusion will be supported.

Authorizing Vehicles: Existing vehicles for specialized skill certifications are regulatory. These requirements could also be inserted in legislation, procurement policy, incentive programs, and mandates on regulated entities such as eligibility requirements for inclusion in the RPS.

C. Skill Standards Requirements in Non-Construction Sectors

California imposes licenses and skill certifications on a wide variety of occupations for reasons of quality, safety, and accountability.¹²⁷ State-regulated certification is common for many professional occupations, such as engineers (structural, civil, fire, chemical, control systems, traffic, etc.), architects, land surveyors, geologists, geophysicists,¹²⁸ physicians,¹²⁹ nurses,¹³⁰ pharmacists,¹³¹ and attorneys.¹³² In low-carbon sectors, apart from construction trades, transit operators and bus mechanics are examples of non-professional occupations that require a license or specific skill certification.

Examples in Low-Carbon Sectors: Transit operators are required to undergo training and obtain appropriate driving licenses. Certifications from state-approved apprenticeships are also expanding. BYD, the electric bus manufacturing company under contract with the Los Angeles County Metropolitan Transportation Authority (LA Metro), has developed a certified joint apprenticeship program for their workforce. A number of transit agencies in California have or are developing apprenticeship programs for transit operators and

¹²⁷ California Department of Industrial Relations, Labor Commissioner's Office, "Electrician Certification Program," 2017, <https://www.dir.ca.gov/dlse/ecu/ElectricalTrade.html>.

¹²⁸ California Department of Consumer Affairs, Board for Professional Engineers, Land Surveyors, and Geologists, "Board for Professional Engineers, Land Surveyors, and Geologists," Department of Consumer Affairs, <https://www.bpelsg.ca.gov/>.

¹²⁹ Medical Board of California, "The Mission of the Medical Board of California," <http://www.mbc.ca.gov/>.

¹³⁰ California Board of Registered Nursing, "Welcome to the Board of Registered Nursing," <https://www.rn.ca.gov/index.shtml>.

¹³¹ California State Board of Pharmacy, "Welcome to the California State Board of Pharmacy," <https://www.pharmacy.ca.gov/>.

¹³² State Bar of California, "The State Bar of California," accessed February 28, 2022, <http://www.calbar.ca.gov/>.

bus mechanics.¹³³ Each program will follow the Division of Apprenticeship Standards regulations, which issue a journey card at completion of training that serves as an occupational certification for workers.

Authorizing Vehicles: Skill certifications can be required in legislation, regulation, by public agencies, in contract bidding, and in requirements for participation in incentive and subsidy programs.

3. Responsible Employer Standards

Another type of workforce policy lever involves placing pre-qualification requirements on businesses that seek government contracts or that benefit from public subsidy programs. This approach can be used to incorporate wage and skill standards, as well as to promote other high-road employment practices.

A. Responsible Contractor Standards (Construction Sector)

Contracts in some public works projects go beyond the legally mandated prevailing wage and apprenticeship utilization standards to include stronger language with the goal of ensuring quality and performance as well as good working conditions.

So-called “responsible contractor standards” generally require that firms meet pre-established, clearly defined minimum standards relating to contractor responsibility, including: all applicable licenses, bonding, and insurance (including workers’ compensation); wage and labor law compliance; no OSHA violations; and permitting that includes passing code inspections. They often include evidence of past performance, and may include the types of wage and skill standards discussed above. As with skills certifications, these standards help ensure high performance and promote good jobs. As with any minimum performance criteria, it is critical to take intentional steps to ensure equal access for historically marginalized groups, including in this case minority and women-owned small businesses.

Examples in Low-Carbon Sectors: Senate Bill 350 (de León, Chapter 547, Statutes of 2015)¹³⁴ requires the California Energy Commission to adopt a responsible contractor policy to ensure that building energy efficiency retrofits meet high-quality performance standards and reduce energy savings lost or forgone due to poor-quality workmanship.¹³⁵ As of the writing of this report, this policy had not yet been implemented.

Authorizing Vehicles: Responsible employer standards are most common in public works contracting but can also be incorporated into legislation (as in SB 350), regulation, incentive program requirements, and mandates on regulated entities.

B. Responsible Employer Requirements in Non-Construction Industries

Responsible employer standards can be used to place pre-qualification requirements on firms that do business with, or receive economic benefits from, the government in non-construction industries. These standards, which could be specified in contracts with public agencies or eligibility criteria for participation in incentive and grant programs, mandate more than compliance with basic minimum wage and employment

¹³³ California Transit Works!, “CTW California Transit Works!,” accessed February 28, 2022, <http://www.catransitworks.org/who-we-are.html>.

¹³⁴ Kevin de Leon, “SB-350 Clean Energy and Pollution Reduction Act of 2015,” Chapter 547, Statutes of 2015 § (2015), https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

¹³⁵ California Energy Commission, “Clean Energy & Pollution Reduction Act: SB 350,” accessed February 12, 2022, <https://www.energy.ca.gov/rules-and-regulations/energy-suppliers-reporting/clean-energy-and-pollution-reduction-act-sb-350>.

laws to include requirements or terms and conditions, with the aim of ensuring that public dollars support quality performance and good jobs. The requirements often include having no violations of employment regulations, evidence of past experience, and sometimes safety training or specialized skill standards.

Examples in Low-Carbon Sectors: The South Coast Air Quality Management District (SCAQMD, or the district) added new rules regarding labor law compliance to its district-funded truck replacement projects. The district assesses a company’s record of labor law violations when reviewing applications for clean truck incentives, and has a disclosure and certification process regarding ongoing labor law compliance for those awarded funding. SCAQMD also prohibits lease-to-own arrangements in contracts involving district-funded trucks.¹³⁶

Authorizing Vehicles: Responsible employer standards can be incorporated into legislation, regulation, incentive program requirements, and mandates on regulated entities.

4. *Project Labor Agreements and Community Workforce Agreements*

A. *Project Labor Agreements (Construction Sector)*

Common in large, complex construction projects, a Project Labor Agreement (PLA) is a pre-hire collective bargaining agreement with one or more labor unions setting the terms and protocols of project execution and worksite conditions and prohibiting work stoppages due to labor disputes. Each PLA is negotiated to meet the needs of a specific project owner/manager. By governing nearly all aspects of the project, PLAs maximize stability in terms of construction timelines and budget, and guarantee positive outcomes. They resolve labor disputes without recourse to strikes or lockouts. By requiring the use of state-certified apprenticeship programs, PLAs benefit both contractors and communities by engaging a workforce that is undergoing or has undergone rigorous training and that is paid family-sustaining wages. Compensation standards generally include prevailing wages and contributions to health, retirement, and training trust funds managed by a joint labor-management committee. PLAs have long been used for public works projects funded by the federal government and state, county, and municipal agencies. In California, they are also sometimes used by developers on large private projects.

Examples in Low-Carbon Sectors: Many of California’s large public transit projects with state or local government funding have used PLAs, including LA Metro’s Measure R projects.¹³⁷ PLAs have become the industry norm and are used on almost all utility-scale renewable energy construction projects, even though they are not required by state law.

Authorizing Vehicles: PLAs are not mandated in state law, but state law authorizes public agencies to use PLAs (see Public Contract Code 2500) and prohibits charter cities from adopting measures to ban PLAs on

¹³⁶ South Coast Air Quality Management District, Board Meeting Minutes, October 5, 2018, Agenda No. 29 (Report from the Technology Committee meeting held September 21, 2018), <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2018/2018-oct5-029.pdf?sfvrsn=2>.

¹³⁷ Los Angeles County Metropolitan Transportation Authority and The Los Angeles/Orange Counties Buildings and Construction Trades Council Affiliated with The Building and Construction Trade Department (AFL/CIO) And Signatory Craft Council and Local Unions, “Project Labor Agreement,” 2012, http://media.metro.net/about_us/pla/images/project_labor_agreement_2012.pdf.

state-funded construction projects.¹³⁸ PLAs have recently been used on construction of state buildings. PLAs can be mandated by awarding agencies for construction projects.

PLAs often include local or targeted hire provisions which set goals for the percentage of local workers who are hired or workers from specific targeted groups. In these cases, PLAs are often called Community Workforce Agreements (CWAs), and that is the nomenclature we use in this report.

In San Diego County, the legal framework for PLAs has gone back and forth, with motions to introduce or reverse local prohibitions initiated through various ballot measures. As local examples show, PLAs do work to ensure job quality and job access, and the situation in San Diego County seems to be moving towards general approval. There is already state legislation (SB 922) supporting PLAs. President Biden’s executive order signed in February 2022 further bolsters use of PLAs, requiring them to be used in federal construction projects over \$35 million.¹³⁹ A recent Notice of Funding Opportunity for the U.S. Department of Transportation’s RAISE program includes the use of PLAs as merit criteria for funding awards.¹⁴⁰

LOCAL EXAMPLES:

- Since 2009, a [Project Stabilization Agreement](#) (PSA) has been in effect between the San Diego Unified School District (SDUSD) and the San Diego Building and Construction Trades Council and Southwest Regional Council of Carpenters, setting basic standards for hiring, dispute resolution, wage and benefit rates, and hiring of skilled craftspeople and apprentices living within SDUSD boundaries for construction work funded by Propositions S and Z, for all projects equal to or exceeding \$1 million in value.¹⁴¹ According to its website, SDUSD uses Prop. S and Prop. Z funds “to repair, renovate and revitalize district schools” with capital improvements at traditional and charter schools throughout the district.¹⁴² As of January 2022, over 17,000 workers have been employed under this PSA, on 202 projects since 2009. In addition to ensuring family-sustaining wages and benefits for all workers (whether employed by union or non-union contractors on PSA projects), the PSA includes goals for employing workers from targeted zip codes in San Diego that constitute historically underserved communities: 34% of all union worker referrals to the PSA projects live in target zip codes.¹⁴³ The district reports their projects have been built below the estimated costs, indicating that they have actually saved money under this PSA.

¹³⁸ California Code, “Project Labor Agreements,” Chapter 2.8 Public Contract Code - PCC § 2500-2503 (2012), https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=PCC&division=2.&title=&part=1.&chapter=2.8.&article=.

¹³⁹ Nandita Bose, “Biden to Sign Executive Order Boosting Rights of 200,000 Construction Workers,” *Reuters*, February 5, 2022, sec. United States, <https://www.reuters.com/world/us/exclusive-biden-sign-executive-order-boosting-rights-200000-construction-workers-2022-02-03/>.

¹⁴⁰ “Notice of Funding Opportunity for the Department of Transportation’s National Infrastructure Investments (i.e., the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program) under the Infrastructure Investment and Jobs Act (‘Bipartisan Infrastructure Law’)” (Department of Transportation | Office of the Secretary of Transportation, January 27, 2022).

¹⁴¹ “Construction | Project Stabilization Agreement,” San Diego Unified School District, accessed November 14, 2021, https://sandiegounified.org/departments/facilities_planning_and_construction/doing_business_with_facilities_planning/project_stabilization_agreement.

¹⁴² “Propositions S & Z,” accessed December 29, 2021, https://sandiegounified.org/departments/facilities_planning_and_construction/bond_programs/propositions_s_z.

¹⁴³ “PSA Workforce Utilization Summary Report” (San Diego Unified School District, January 11, 2022), https://sandiegounified.org/departments/facilities_planning_and_construction/doing_business_with_facilities_planning/project_stabilization_agreement.

- The San Diego County Water Authority does all construction for its Emergency Storage Project (ESP) through a PLA with the San Diego County Building and Construction Trades Council. The ESP is a \$1.5 billion capital improvement project to provide region-wide emergency water supply and distribution thanks to a system of dams, reservoirs, pipelines, and pump stations. Over the past two decades, a number of major construction projects have been carried out under the PLA at key facilities, including building the Olivenhain Dam (completed in 2003) and raising the San Vicente Dam (up to 2013).¹⁴⁴
- SANDAG PLA: In December 2021, SANDAG approved a five-year deal with the San Diego County Building and Construction Trades Council, attaching union wage and benefit standards and local and targeted hiring goals to projects (for contracts over \$5 million) stemming from the agency’s \$162.5 billion regional transportation plan. Under the deal, “Building trades and signatory unions will implement hiring goals for ‘targeted’ and disadvantaged workers and no work stoppages.”¹⁴⁵ Using metrics (see step 5 below) to track the impact of this newly approved PLA in terms of jobs, equity, and job quality, from the start, can identify areas for improvement and provide valuable data on effectiveness.

B. Community Workforce Agreements (Construction Sector)

Community Workforce Agreements (CWAs) consist of a Project Labor Agreement that includes language to broaden access to good jobs in construction. These “targeted” or “local” hire provisions typically include requirements to hire a certain minimum percentage of workers from zip codes that are near the project (known as “local hire”) and/or from economically disadvantaged communities. Many CWAs also set hiring goals for underrepresented populations, veterans, and/or women, often by giving preference to graduates of pre-apprenticeship programs that target historically excluded groups. In California, because of Prop. 209, explicit targeting to improve hiring of workers from underrepresented racial/ethnic groups is prohibited, but local and targeted hiring policies and practices have proven effective at improving access and inclusion in many instances.

CWAs are most successful when there are strong pre-apprenticeship programs that work closely with the building trades unions, because these programs can ensure that there is a pool of qualified local or targeted entry-level workers who can be hired on the project. It is costly to build a pipeline of qualified entry-level workers from underrepresented groups, so CWAs are most practical on large-scale projects or an aggregation of smaller projects governed by the same CWA. The strength of this policy is that it increases the number of good jobs while ensuring inclusion of historically marginalized workers.

Examples in Low-Carbon Sectors: The California High-Speed Rail Authority’s Community Benefits Agreement,¹⁴⁶ which was finalized in 2013 stipulates that 30 percent of the hours will be performed by “National Targeted Workers,” which is defined in the agreement as those who reside in zip codes that

¹⁴⁴ “San Diego Building and Construction Trades Council, AFL-CIO | Projects,” accessed February 11, 2022, <https://www.sdbuildingtrades.com/major-projects/>.

¹⁴⁵ Steve Puterski, “SANDAG Approves Five-Year Project Labor Agreement for 5 Big Moves,” *The Coast News | The Inland Edition*, December 21, 2021, <https://thecoastnews.com/sandag-approves-five-year-project-labor-agreement-for-5-big-moves/>.

¹⁴⁶ This is technically a Community Workforce Agreement under the definitions we are using here. See California High-Speed Rail Authority, “Community Benefits Agreement: Putting Californians to Work,” May 2015, https://www.hsr.ca.gov/docs/newsroom/fact%20sheets/CBA_Factsheet_FINAL_0050415.pdf.

include a census tract or portion thereof in which the median annual household income is less than \$40,000 per year.¹⁴⁷

Authorizing Vehicles: Like PLAs, CWAs are not mandated in state law. For construction projects, CWAs are negotiated by many public awarding agencies, such as counties, cities, school districts, and ports.

5. Inclusive Procurement Policies for Purchases of Large Capital Equipment, Contracts for Public Services, and Grants

Public procurement by state, county, and municipal government entities enables a variety of measures that encourage businesses that contract with public entities to comply with high labor standards or provide other public benefits. Federal law preempts states from requiring bidders to negotiate Community Workforce Agreements (CWAs) or Community Benefits Agreements (CBAs) like those in the construction industry, but state procurement policies can include requirements for a floor on wages, skill standards, and more, and procurement can provide incentives for bidders to enter into a CBA. An agreement between community stakeholders and a business bidding for a public contract, a CBA provides a variety of local employment and community benefits in exchange for community support for the project. Many CBAs are negotiated with a developer by broad-based local coalitions that include community, environmental, and religious organizations as well as labor unions. Though legally binding, CBAs are not traditional collective bargaining agreements.

Procurement processes can determine wage and benefits standards in several ways. In some cases, service contractors are required to pay a living wage, as determined by local living wage ordinances. In other cases, particularly for services that are also carried out by public-sector workers, wage parity between public and private workers is required in order to discourage contracting out for the sole purpose of saving labor costs.

¹⁴⁸

One practical way to use procurement to ensure job quality is to seek the “best-in-class” employer, rather than predetermine labor standards. This approach is used by the [U.S. Employment Plan](#) (USEP), an initiative created by Jobs to Move America, a national organization advocating responsible use of public transit procurement. The USEP is discussed in more detail in the Transportation chapter, and below in the section entitled “[Heavy-Duty Transit Vehicle Manufacturing—Procurement for the Public Good.](#)”

Example in Low-Carbon Sector: Various public agencies in California, including the High Speed Rail Authority and Los Angeles County Metropolitan Transportation Authority (LA Metro), have adopted and used the U.S. Employment Plan (USEP) in procurement of commuter rail cars and transit buses. In fact, LA Metro now has a Permanent U.S. Employment Plan policy, requiring the USEP in all future procurements of new manufactured vehicles and equipment above \$100 million.

Like CWAs, the strength of these policies is that they increase the number of good jobs while ensuring inclusion from historically marginalized workers.

¹⁴⁷ California High-Speed Rail Authority, “Community Benefits Agreement,” August 13, 2013, https://www.hsr.ca.gov/Programs/Construction/community_benefits_agreement.html.

¹⁴⁸ Eduardo Porter, “Harvard Is Vaulting Workers Into the Middle Class With High Pay. Can Anyone Else Follow Its Lead?,” *The New York Times*, September 8, 2018, sec. Business, <https://www.nytimes.com/2018/09/08/business/economy/harvard-living-wage.html>.

Authorizing Vehicles: Community-benefitting procurement policies can be implemented through contract bidding language that requires them, or by adding points in the ranking of projects in a competitive solicitation.

The state High-Road Plan highlights the following promising inclusive procurement practices:

Heavy-Duty Transit Vehicle Manufacturing—Procurement for the Public Good

The Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP, a CCI program administered by CARB) incentivizes the purchase of hybrid and zero-emission heavy-duty vehicles to accelerate “early market penetration of clean technologies.”¹⁴⁹ For the public transit sector, HVIP represents one of the state’s efforts to induce and assist California’s more than 200 transit agencies, which utilize about 10,000 transit buses, to transition to zero-emission fleets. The transition to a fully zero-emission transit bus fleet statewide (by 2040) is now mandated by the State’s Innovative Clean Transit Rule (ICT Rule) adopted by CARB in December 2018. Furthermore, in adopting the rule, CARB also addressed employment and training in the ZEB sector and committed to investing additional resources to increase access to jobs in the manufacture and operation of zero-emission transit buses.

CARB’s regulatory and incentive measures have helped support a growing zero-emission bus manufacturing sector in California. BYD, Ebus, GreenPower Bus, and Proterra are zero-emission bus (ZEB) manufacturers that have recently established production and assembly facilities in the state, in anticipation of a growing ZEB market in California and beyond.^{150, 151} More than 100 zero-emission transit buses are currently in use in California, and there are more than 300 more on order.¹⁵²

Using procurement policies that explicitly value job creation, job quality, and job access has allowed transit agencies to use their heavy-duty clean vehicle purchases as a tool to help ensure better job quality and local employment outcomes for manufacturing workers. These procurement policies include incorporating solicitation language that incentivizes “bus and rail manufacturers to commit to creating good manufacturing jobs, investing in new or existing manufacturing facilities, and establishing pathways into the industry for people facing barriers to employment.”¹⁵³

The [U.S. Employment Plan](#) (USEP) developed by the nonprofit Jobs to Move America provides a template to incorporate workforce policies and practices into competitive solicitations for public procurement. The USEP is based on procurement language that asks bidders to voluntarily make commitments and specify plans for job creation, job quality (e.g., wage and benefit levels), and job access (e.g., training partnerships and targeted hiring practices). Agencies responsible for the procurement then score applications to reward applicants that make concrete commitments to creating family-supportive jobs and expanding job access. After comparing the proposals in full and determining which one offers the best overall value (e.g., assessing price, technical specifications, and

¹⁴⁹ California Air Resources Board, “Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project,” October 10, 2017, <https://www.arb.ca.gov/msprog/aqip/hvip.htm>.

¹⁵⁰ Christopher Thornberg et al., “2018 California Green Innovation Index” (Next 10, 2018), <http://next10.org/sites/default/files/2018-ca-green-innovation-index.pdf>.

¹⁵¹ Frances Anderton and Avishay Artsy, “Los Angeles Has Become the Detroit of Electric Buses,” *KCRW Design and Architecture*, July 11, 2017, <https://www.kcrw.com/culture/shows/design-and-architecture/los-angeles-has-become-the-detroit-of-electric-buses>.

¹⁵² California Air Resources Board, “Update on Innovative Clean Transit (ICT) Discussion Document,” March 27, 2018, <https://arb.ca.gov/msprog/ict/meeting/mt180327/180327ictconcept.pdf>.

¹⁵³ Jobs to Move America, “U.S. Employment Plan Fact Sheet,” October 2015, <https://metro council.org/getdoc/6a488e92-1879-4811-8cf8-9fc32ed636a5/BusinessItem.aspx>.

past performance, as well as job commitments), agencies can then determine which bidder to award the contract.

To ensure job-related commitments detailed in the USEP are actually achieved, agencies can request regular reporting from awarded contractors/vendors to track the key outcomes, namely the quantity and quality of, and access to, new or sustained jobs. The agency can utilize a menu of commonly-used corrective actions to assist the contractor/vendor fulfill its commitments, if the agency determines a company does not reach certain milestones or has fallen out of compliance with its USEP commitments.

Transit agencies like the Los Angeles County Metropolitan Transportation Authority (LA Metro) have permanent U.S. Employment Plan policies, in which all future procurements of new manufactured vehicles and equipment above \$100 million will include the USEP. Companies bidding on future LA Metro contracts can now improve their competitive advantage by committing to job quality and job access targets. In LA Metro's competitive solicitation in 2016 for the procurement of new zero-emission buses, the bidders were given the opportunity to commit up front to hiring targets as part of their application, and job benefits were an explicit part of the ranking of bids.

One of the bidding ZEB manufacturers (BYD, a company with manufacturing facilities in Lancaster, CA) sought to make their proposal more competitive by committing to a community hiring program and pre-hire program under a Community Benefits Agreement (CBA) with the Jobs to Move America coalition. These targeted hire programs have helped expand job access to BYD's transit bus manufacturing jobs. Specifically, BYD committed to a target of recruiting and hiring 40 percent of its workers from populations facing significant barriers to employment (e.g., veterans and formerly-incarcerated individuals) under the negotiated CBA. Accordingly, the USEP incentivizes companies to enter into CBAs that both increase the competitiveness of their applications and ultimately help strengthen their training and hiring practices to ensure job-seekers that have faced barriers to stable, family-sustaining jobs have a clear pathway into a high-road manufacturing industry.¹⁵⁴

6. Inclusive Hiring (All Sectors)

Inclusive hiring, sometimes called "First-source hiring," "targeted hiring" or "local hiring," focuses on improving job access for workers from disadvantaged groups or communities. Under an inclusive hiring system, community organizations or training programs serving disadvantaged workers refer local job applicants to employers; in turn, the employers agree to notify the referring organizations when there are job openings and to look at its referrals first in their review of job applicants.¹⁵⁵ To have impact, inclusive hiring should only target higher-wage jobs or jobs with structured career ladders, or be incorporated into CWAs or CBAs as part of the local or targeted hire agreements. If they are stand-alone programs that do not have a job-quality strategy, they serve only to funnel disadvantaged workers into low-wage jobs and to replicate existing inequality in the labor market.

¹⁵⁴ Jobs to Move America, "Our Work - California," accessed February 11, 2022, <https://jobstomoveamerica.org/region/california/>.

¹⁵⁵ Carol Zabin et al., "Workforce Issues and Energy Efficiency Programs: A Plan for California's Utilities (WE&T Guidance Plan)" (UC Berkeley Donald Vial Center on Employment in the Green Economy, May 2014), <http://laborcenter.berkeley.edu/workforce-issues-and-energy-efficiency-programs-a-plan-for-californias-utilities/>.

Authorizing Vehicles: Local or targeted hire requirements can be mandated in public procurement contract bidding, in program requirements for incentive programs, and in other programs where employers are receiving public or ratepayer funds. They are most effective when they are linked to the expansion of good jobs, as in CWAs and CBAs.

7. Retention of Work in Public-Sector or Regulated Entities (All Sectors)

Across a variety of industries, contracting out by the public sector or large private firms has been shown to lead to significant declines in job quality. While wage standards such as living wage ordinances can limit declines in job quality in the context of outsourcing, from a good-jobs perspective it is preferable to retain work in public enterprises or regulated firms like the IOUs. Since these entities are often unionized and/or already have internal wage floors, avoiding outsourcing can help ensure job quality. With more accountability than unregulated firms, they are also more likely to have job access strategies in place or be open to them.

Example in Low-Carbon Sector: The LADWP made a decision to insource weatherization jobs that had previously been contracted out. They then created a pre-craft job classification in the utility and a training program for weatherization that functions as a pre-apprenticeship program serving as a pipeline into career utility employment in a skilled trade. This approach has transformed weatherization from a low-wage, dead-end job to a job with a living wage floor (\$16 per hour and full benefits when the program started in 2011) and a career ladder.¹⁵⁶

Authorizing Vehicles: Public or regulated entities can authorize retention of public employment or insourcing of previously outsourced activities.

8. Enforcement of All Labor and Employment Law, Including Proper Classification of Employees vs. Independent Contractors

A company's incorrect designation of its employees as "independent contractors" strips workers of essential wage and other workplace rights under state and federal labor and employment law and generally lowers their net wages and benefits. It also drains tax revenues, and disadvantages employers that do comply with the rules, correctly classify workers, and pay for payroll taxes, workers' compensation insurance, and other employee protections. Many companies in transportation, janitorial, logistics, home care and domestic work, construction, tech, and other sectors have put workers outside of workplace protections by claiming that they are independent contractors instead of employees. Under the law, however, these arrangements are permissible only when the worker is running a separate business.¹⁵⁷ The misclassification problem greatly affects some occupations that are directly impacted by climate policy, including truck drivers, as described in Chapter 7. Climate policies can include requirements to help ensure workers are not misclassified.

Examples in Low-Carbon Sectors: The South Coast Air Quality Management District (SCAQMD, or the district), the air pollution control agency for all of Orange County and parts of Los Angeles and Riverside

¹⁵⁶ Ellen Avis and Carol Zabin, "Training for the Future, Workforce Development for a 21st Century Utility Los Angeles's Utility Pre-Craft Trainee Program" (UC Berkeley Donald Vial Center on Employment in the Green Economy, 2013), http://laborcenter.berkeley.edu/pdf/2013/training_future13.pdf.

¹⁵⁷ California Employment Development Department, "Employment Determination Guide (DE 38)," n.d., https://www.edd.ca.gov/pdf_pub_ctr/de38.pdf; and California Department of Industrial Relations, Labor Commissioner's Office, "Independent Contractor versus Employee," https://www.dir.ca.gov/dlse/faq_independentcontractor.htm.

Counties, added new rules regarding labor law compliance to its district-funded truck replacement projects. The district assesses a company's record of labor law violations when reviewing applications for clean truck incentives, and has a disclosure and certification process regarding ongoing labor law compliance for those awarded funding. SCAQMD also prohibits lease-to-own arrangements in contracts involving district-funded trucks.¹⁵⁸

Authorizing Vehicles: Just as with wage standards and responsible contractor policies, businesses contracting with public agencies or receiving public funds could be required to verify compliance with proper employee classification laws.

Costs and Benefits of Labor Standards

The workforce policy levers described above generally lead to higher wages and better benefits. A legitimate question is whether higher-quality jobs will increase the costs of climate measures, and if so, by how much. A substantial body of research shows that the benefits of labor standards implemented in a variety of industries in the United States outweigh the costs. In construction, numerous studies have shown that prevailing wages, project labor agreements (PLAs), and other mandates for high-road labor standards have not raised costs where they have been implemented, as productivity improvements make up for higher wages and benefits.¹⁵⁹ For example, a 2017 research study by the UC Berkeley Labor Center analyzed 88 community college projects that were built with PLAs and 175 that were built without PLAs. This study found evidence suggesting that PLAs did not reduce the number of bidders or raise costs; on the contrary, the projects built under PLAs had slightly more bidders compared to non-PLA projects, and their low bids came in slightly lower than those of non-PLA projects.¹⁶⁰ Research has shown similar results in other industries: better wages and working conditions attract more highly skilled workers and lead to decreased turnover, which in turn improves productivity and performance of the workforce, thereby offsetting a portion of the higher compensation.¹⁶¹

¹⁵⁸ South Coast Air Quality Management District, Board Meeting Minutes, October 5, 2018, Agenda No. 29 (Report from the Technology Committee meeting held September 21, 2018), <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2018/2018-oct5-029.pdf?sfvrsn=2>.

¹⁵⁹ Nooshin Mahalia, "Prevailing Wages and Government Contracting Costs: A Review of the Research," Briefing Paper, July 3, 2008, <https://www.epi.org/publication/bp215/>.

¹⁶⁰ Emma Waitzman and Peter Philips, "Project Labor Agreements and Bidding Outcomes: The Case of Community College Construction in California" (UC Berkeley Center for Labor Research and Education, January 9, 2017), <http://laborcenter.berkeley.edu/project-labor-agreements-and-bidding-outcomes/>.

¹⁶¹ Michael Reich, Ken Jacobs, and Miranda Dietz, *When Mandates Work: Raising Labor Standards at the Local Level* (Berkeley and Los Angeles, California: University of California Press, 2014), <http://irle.berkeley.edu/when-mandates-work/>.

Appendix C. Supply-Side Workforce Development Strategies: Preparing Workers for the Low-Carbon Transition

This chapter provides recommendations for the best approaches to skill building for the transition to a carbon-neutral economy, outlining strategies that support middle-class careers and the inclusion of disadvantaged workers. When combined with the demand-side strategies discussed in Chapter 2, these strategies can equip workers with the skills they need to adapt to new technologies and meet the needs of businesses in energy, transportation, and other key industries as they reduce their greenhouse gas emissions. The recommendations can also ensure that the economic benefits arising from policies to mitigate climate change are more accessible to workers from disadvantaged communities.

These strategies differ dramatically from the first generation of “green jobs training” that occurred a decade ago, which showed the downsides of creating new short-term training programs for “green” occupations like rooftop solar installer or energy auditor. Many of these first green jobs training programs had poor results for job placement and wage improvements for participants. The programs assumed that green jobs were quite different from other jobs; however we now know that the vast majority of the jobs that reduce greenhouse gas emissions are in traditional occupations related to the key industries producing and consuming fossil fuels for electricity, transportation, and other uses. Mechanics for zero-emission vehicles are still motor vehicle mechanics, engineers who design more efficient HVAC systems are still engineers, production workers who manufacture electric cars are still autoworkers, and architects who design energy-efficient buildings are still architects, even though, in all cases, they need to continually upgrade their skills as technologies evolve.

Skills Upgrading for the Future and Incumbent Workforce

Based on the experience of implementing climate policy at the state level over the last decade and the research and recommendations in the state High-Road Plan and the information from the RDF job impact analysis, we highlight three important sets of workers who need to be equipped with new knowledge and skills for decarbonization initiatives:

Professional Workers

As shown in the High-Road Plan and the RDF job impact analysis, professional workers are a small share of workers, but they are essential as they are involved in the design and planning of technologies, processes, and products needed to reduce greenhouse gas emissions. They range from engineers who design renewable power plants to architects who incorporate new technologies to make buildings more energy-efficient to transportation planners who incorporate design transit and land use policy to lower vehicle miles traveled. These professional jobs generally require specific higher educational credentials, bachelor’s or graduate degrees and sometimes technical certifications from community colleges. It makes much more sense to incorporate new knowledge and skills related to reducing greenhouse gas emissions into these educational pathways rather than create new programs focused only on “green jobs.” These jobs are family-supporting, generally with good health and retirement benefits.

The San Diego region has an extremely robust network of colleges and universities, with UC San Diego, several Cal State universities, private universities like University of San Diego, and many community colleges. These schools provide ample infrastructure to train the next generation of engineers, architects, planners, and other professional workers that are needed to develop and implement the decarbonization efforts in the region.

Construction Trades Workers

The construction occupations are the single most important jobs because the great majority of the work involved in decarbonization requires rebuilding of energy and transportation infrastructure. The skilled trades are the main workforce in the construction of renewable energy power, in decarbonization of buildings, in building out electric vehicle charging infrastructure, in in-fill and transit-oriented development, and in transit capital projects like rail. For occupations in the skilled construction trades which already have state-certified apprenticeship programs and where employers already fund training and participate in curricula committees, skills upgrading is baked into how training is designed and implemented.¹⁶²

Apprenticeship is the gold standard for training due to its earn-while-you learn model, the deep engagement of employers in the financing and content of training, its ability to calibrate training slots to the number of available jobs, and other features highlighted in the state High-Road Plan (see Chapter 3). State-certified apprentice programs guarantee wage increases as skills are acquired, as determined by state prevailing wages, and lead to family-supporting careers. Segments of the construction industry not tied to apprenticeship and prevailing wages, particularly residential construction, can be low wage with poor benefits.¹⁶³ Research also confirms that apprenticeship also helps retain a skilled workforce in construction, which contracts and expands with the business cycle.¹⁶⁴

The San Diego region has over twenty state certified construction trades apprenticeship programs, addressing the full spectrum of both basic trades such as laborers and carpenters, and skilled trades such as electricians, plumbers and pipefitters.

In terms of ethnicity, the apprenticeship programs in the San Diego region appear to have strong diversity, with the Latinx community being particularly well represented. Apprentices of Hispanic origin, the label used in Department of Apprenticeship Standards (DAS) data, consistently represent the largest group in San Diego region Building Trades apprenticeships, growing from 48% of total enrollment in 2010 to 69% in 2021.¹⁶⁵ White apprentices made up 41% of participants in 2010 and 22% in 2021.¹⁶⁶ African Americans have averaged around 6.6%,¹⁶⁷ slightly above their share of the labor force in California, 6.2% in 2021.¹⁶⁸

¹⁶² It should be noted that the RDF job impact study confirms the prevalence of construction work, although this is not obvious since the energy modeling names a variety of categories to describe activities that are generally carried out by construction trades workers. For energy demand, this includes the installation of energy efficient HVAC and lighting, and installation of electric vehicle charging infrastructure which is the main economic activity needed to reduce consumption of gasoline. For energy supply, renewable power plants as well as rooftop solar and other distributed energy sources are all built or installed by construction trades workers.

¹⁶³ Zabin et al., "Putting California on the High Road: A Jobs and Climate Action Plan for 2030"; and Ken Jacobs and Kuochih Huang, "The Public Cost of Low-Wage Jobs in California's Construction Industry" (UC Berkeley Center for Labor Research and Education, June 8, 2021), <https://laborcenter.berkeley.edu/the-public-cost-of-low-wage-jobs-in-californias-construction-industry/>.

¹⁶⁴ Peter Philips, *The Economics of Prevailing Wage Laws*, (with Hamid Azari-Rad and Mark Prus), Routledge: 2005; "Health Insurance and Worker Retention in the Construction Industry," *Journal of Labor Research*, "Effect of Multiemployer Collective Bargaining on Employer-Provided Health Insurance in the Construction Industry," *Journal of Labor Research*, "A Case Study of Labor Turnover on a Large Industrial Construction Project," *Journal of Construction Engineering & Management*, (all with JaeWhan Kim); and "Analysis of the Impacts of the Number of Bidders upon Bid Values: Implications for Contractor Prequalification and Project Timing & Bundling," *Public Works Management & Policy*, (with Sheng Li).

¹⁶⁵ Apprenticeship Data for San Diego and Imperial Counties, 2010–2021. California Department of Industrial Relations. <https://www.dir.ca.gov/>.

¹⁶⁶ Apprenticeship Data for San Diego and Imperial Counties, 2010–2021.

¹⁶⁷ Apprenticeship Data for San Diego and Imperial Counties, 2010–2021.

¹⁶⁸ "California Demographic Labor Force: Summary Tables," Labor Market Info - Employment Development Department, State of California, November 2021, https://www.labormarketinfo.edd.ca.gov/specialreports/CA_Employment_Summary_Table.pdf.

In terms of gender, however, Building Trades apprenticeships in the region fall below the national average of around 3.6% women,¹⁶⁹ with female apprentices representing an average of just 2% of enrollment per year from 2010 to 2021,¹⁷⁰ but reflecting low participation of women in construction in the region overall.

Other Blue-Collar Occupations

It is also important to note that some jobs that will be impacted by the region's decarbonization are in blue-collar occupations in industries where no apprenticeship programs currently exist and where employers do not require specific educational credentials, but rather workers learn on the job. This is true for many jobs in manufacturing, transportation, and the implementation of natural lands restoration and urban forestry. Here, the state's high road training partnerships (H RTP) initiative provides a significant opportunity to develop training partnerships that start from the jobs and engage employers for upskilling the incumbent workforce. Industry training partnerships are key to successful workforce training for these occupations. Business has to be at the table to identify specific skill and training needs and to commit to training their incumbent workers or new hires, or to interview graduates of the training programs as job openings occur. H RTPs can partner with community colleges and other training organizations so that training can respond to employer needs and avoid programs that are disconnected to actual jobs and fall into a "train and pray" model. H RTPs have been developed in critical industries, including transit, warehousing, logistics, transportation, water utilities, building services, energy utilities, health care, and hospitality.

A particularly relevant H RTP for San Diego's decarbonization framework is the Green Janitors Training Program, which serves Los Angeles, Orange and San Diego counties. It is a high road industry training partnership that is implemented by the Building Skills Partnership, a nonprofit collaboration between SEIU-USWW, commercial building owners, janitorial employers, client companies, and community leaders. Janitors are the frontline staff that can improve the operation of buildings and research has documented reductions in energy use in the buildings that are operated by janitors who have graduated from the training program.¹⁷¹

Inclusion of Disadvantaged Workers

Providing pipelines for workers from disadvantaged communities into career-training pathways and family-supporting jobs is an essential component of a decarbonization strategy that is also committed to equity. The inclusion of workers from historically marginalized communities will not occur without intentional intervention, as persistent trends in the labor market continue to produce significant wage inequality, with workers of color and women experiencing much greater barriers to family-supporting and rewarding career paths. The success of inclusion programs should be measured by their ability to place graduates in career-track jobs with family-supporting wages and benefits, or to provide access to further training that provides entry into such jobs.

Where educational or other skill certifications exist or can be promoted, they must always be coupled with intentional policies to bring underserved workers into the career pipeline. If disadvantaged workers are not supported to acquire the relevant skills, standards and certifications can create barriers, rather than pathways into good jobs. Building pathways to these career tracks will require targeted strategies specific to each occupation type.

¹⁶⁹ IWPR analysis of [RAPIDS data](#) in Eve Mefferd, "Apprenticeships for Women Are Building the Future" (Institute for Women's Policy Research (IWPR), November 17, 2020).

¹⁷⁰ Apprenticeship Data for San Diego and Imperial Counties, 2010–2021.

¹⁷¹ Scott Barenfeld et al., "Analyzing and Expanding the Green Janitor Education Program" (SeedLA, 2017), <http://www.buildingskills.org/wp-content/uploads/2013/11/SEEDLAFinalpdf.pdf>.

Professional Workers

Broadening access to economic opportunities that emerge from the growth of low-carbon sectors should include efforts to improve inclusion in jobs that require bachelor's or graduate degrees. For these occupations, inclusion efforts are most successful when linked to preparation for the high school to college transition and to improve college graduation rates, as it is much more difficult to create paths to higher education after workers have been detached from school for long periods of time. Efforts throughout the state, including in San Diego, are underway to build successful school-to-career transition in both community colleges and four-year institutions. Programs such as the California Partnership Academies, the California Linked Learning Initiative, and the California Career Pathways Trust have each promoted college and career readiness for students in low-income communities by integrating rigorous academics with career-based learning and real-world workplace experiences. These programs may touch on knowledge and skill acquisition related to decarbonization, but provide a broader foundation for multiple careers, so that students can make decisions about their career specializations at the appropriate time in their education. Again, it is essential to avoid creating new initiatives targeted only at so-called green jobs.

Skilled Construction Trades

California has developed a successful model for apprenticeship preparation in the construction trades with a dedicated funding stream through the California Workforce Development Board (CWDB) High Road Construction Careers initiative.¹⁷² The CWDB has established standards for construction pre-apprenticeship which include the involvement and commitment of local building trades councils and use of the multi-craft curriculum (MC3) developed by the national Building and Construction Trades Council of the AFL-CIO. The MC3 is required by state law for construction pre-apprenticeship programs, provides basic training designed to prepare workers for any construction trade and to help participants determine which trade is the best fit, thus increasing long-term retention. To support diversity and the success of participants facing various barriers, many pre-apprenticeship programs also provide “wrap-around” supportive services, both in class—in the form of life-skills workshops—as well as out of class, in connections to childcare, transportation, and housing assistance, tool and boot provision, record expungement, or drug and alcohol counseling. Pre-apprenticeship programs that follow these standards have proven track records for improving access to state-certified apprenticeship for workers from historically marginalized communities.

Pre-apprenticeship programs are often targeted to specific populations such as formerly incarcerated workers or women workers. An example of a successful targeted program is the Flintridge Center's Apprenticeship Preparation Program (APP), serving Los Angeles County, one of four pre-apprenticeship programs supported by the CWDB with a focus on formerly incarcerated women. The program provides a 12-week course that prepares participants for union apprenticeship programs, utilizing an innovative, trauma-informed approach to address challenges facing this population which includes peer mentoring as well as wrap-around services and a focus on recovery, fitness, nutrition, collaborative skill-building, and creative expression.

In the San Diego region, there is one such program for returning citizens, particularly with felony convictions.

¹⁷² California Workforce Development Board, “High Road Partnerships for Construction Careers,” <https://cwdb.ca.gov/initiatives/hrcc/>.

LOCAL EXAMPLE:

- [Homework Reentry Career Program](#) helps prepare participants for apprenticeships in the Building Trades.

While somewhat informal and limited in reach, this program has been effective for individuals involved.

There may be a need for more formal union pre-apprenticeship programs in the region, to create a broader pipeline into Building Trades apprenticeships, including for target populations facing specific barriers. The state of California funds such pre-apprenticeship programs, with clear high road guidelines, through its High Road Construction Careers program, and is available for the San Diego region.

There are currently three state-funded MC3 programs in the San Diego region.

LOCAL EXAMPLES:

- San Diego College of Continuing Education (SDCCE) [High Roads Construction Apprenticeship Readiness Program](#) is a 12-week MC3 program that prepares adults (18 and older) for apprenticeships in the building and construction trades. SDCCE and its partner organizations (SANDAG, San Diego Workforce Partnership, and the San Diego County Building and Construction Trades Council) have been awarded a seven-figure grant to train disproportionately impacted populations for union careers.
- Urban Corps of San Diego County's [Construction Apprenticeship Readiness Program](#) (CARP) teaches the MC3 curriculum, making graduates of the program strong candidates for a building trades apprenticeship.
- [Youth Build](#) is an MC3 program for young adults (ages 18 to 24) without a high school diploma co-run by the San Diego County Building and Construction Trades Council and the San Diego-Imperial Counties Labor Council.

Non-Construction Blue-Collar Workers

As with pre-apprenticeship programs, other pipeline programs should be designed in response to the specific needs of targeted employers in a region, rather than starting with a training program for a given population and trying to then win employer support or commitment. All inclusion programs should include 1) comprehensive services that include entry-level skills training and a suite of supports, mentoring, and wrap-around services tailored to targeted populations; and 2) explicit connections to family-supporting jobs through specific commitments from employers or other proven avenues to job placement, or entry into further career training that leads to placement in family-supporting careers. They should not be developed for low-wage jobs unless the initiatives include strategies to improve job quality or create ladders from low-wage to good jobs.

Some of the most successful inclusion programs in the state are components of HRTPs, which may also include incumbent worker training that moves some current low-wage workers up a job ladder, leaving openings for new entrants. Certified apprenticeship programs are structured to do this, and this approach also has been successfully developed in healthcare, hospitality, culinary, and other industries.

Several training programs in the San Diego region work to assist populations facing barriers to employment.

LOCAL EXAMPLES:

- [Able-Disabled Advocacy](#) is a vocational skills training and educational advancement program for youth, military veterans, adults with disabilities and others seeking employment. This certified, joint committee apprenticeship program provides a starting wage of \$14.00/hr. for apprentices training in Information Technology (IT).¹⁷³
- [Kitchens for Good](#) runs Project Launch, a certified apprenticeship program for individuals overcoming histories of incarceration, homelessness, foster care, mental health issues, or victims of domestic violence. Each year it prepares 150 individuals for careers in the culinary and hospitality industry. The program provides wrap-around services and ongoing career coaching to support apprentices in accessing career opportunities and breaking the cycle of poverty and incarceration.
- [B5 Foundation Culinary Arts Academy](#) offers training programs in culinary arts and hospitality, designed to allow home health workers to increase their income, providing a means of earning family-sustaining pay in a rampantly low-wage occupation. Participants are introduced to B5F through the United Domestic Workers Union, local schools, re-entry programs, and the large community of home health care workers.

¹⁷³ Apprenticeship Data for San Diego and Imperial Counties, 2010–2021.

Appendix D. Background Information on Just Transition

At the heart of a Just Transition is the notion that no workers should pay the cost of a society's decision to meet climate urgency with bold decarbonization. As articulated by J. Mijin Cha in the Just Transition chapter of the state High-Road Plan:

“Just Transition” refers to protection, support, and compensation for displaced workers and communities when a society makes significant policy decisions that result in job loss in affected businesses. In the 1970s, union leader Tony Mazzocchi was an early exponent of the idea of just transition in the context of post-war disarmament and the nation's growing commitment to environmental clean-up from industry. In the early 1990s, when the concept that fossil fuels produce global warming was first being widely accepted, Mazzocchi advocated a just transition for workers in carbon-intensive industries, dubbing the idea a “Superfund for workers” under the logic that “if there can be a Superfund for dirt, there can be a Superfund for workers.”^{174, 175} Mazzocchi reasoned that supporting displaced workers as the economy shifted was not welfare; instead, those who had worked to “provide the world with the energy and the materials it needs deserve a helping hand to make a new start in life.”¹⁷⁶ Just transition refers to ensuring that workers and communities supported by a declining industry are able to transition into a new economy with a comparable level of economic security or retire with dignity. In the current context, a just transition means that carbon-dependent communities and workers must not be forced to bear the costs of change.¹⁷⁷

Just transition programs are complex. They require support and funding for both immediate short-term assistance to workers and communities directly affected by the decreasing use of fossil fuels, and long-term assistance to move fossil fuel communities and workers into a low-carbon economy. Short-term assistance will include skill retraining and upgrade, unemployment insurance, assistance for job placement in comparable jobs for younger workers, and bridges to retirement with fully funded pensions and health care for older workers. Long-term assistance will require diversification of local economies dependent on fossil fuel industries, including support for economic development planning, to help regions better identify the most promising emerging new industries based on regional assets including geography, educational and research institutions, and existing workforce skills. This process will include attracting new businesses and industries and ensuring quality job creation in the same geographic region where jobs are being lost to minimize displacement and relocation.¹⁷⁸

The state High-Road Plan also discusses these examples and principles of stakeholder engagement:

¹⁷⁴ Alexandra Bradbury, “How Do We ‘Change Everything’ without Pitting Workers against the Planet?,” *Labor Notes* (blog), September 8, 2015,

<https://labornotes.org/blogs/2015/09/how-do-we-change-everything-without-pitting-workers-against-planet>.

¹⁷⁵ Labor Network for Sustainability and Strategic Practice Grassroots Policy Project, “‘Just Transition’ – Just What Is It? An Analysis of Language, Strategies, and Projects,” July 6, 2016,

<http://www.labor4sustainability.org/uncategorized/just-transition-just-what-is-it/>.

¹⁷⁶ Robert Pollin and Brian Callaci, “A Just Transition for U.S. Fossil Fuel Industry Workers,” *The American Prospect*, July 6, 2016, <http://prospect.org/article/just-transition-us-fossil-fuel-industry-workers>.

¹⁷⁷ French Economic, Social and Environmental Council, “No Jobs on a Dead Planet—Trade Union Summit on Climate Change,” International Trade Union Confederation, July 27, 2015, <https://www.ituc-csi.org/no-jobs-on-a-dead-planet-trade>.

¹⁷⁸ Excerpted from J. Mijin Cha, “Chapter 4: Just Transition” in Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”

Successful programs require the support of diverse coalitions that include workers, communities, and labor unions. In Black Mesa, the various stakeholders worked together to provide economic alternatives for the Hopi Tribe and Navajo Nation when the coal mine and generating station went offline. Similarly, a wide coalition came together to provide a proactive transition plan for the Diablo Canyon closure.

In addition to strong stakeholder collaboration, local, state, and federal government support is essential to promote the broader economic restructuring that is needed to transition away from fossil fuels. Moving forward, investing in research and developing transition programs in collaboration with impacted parties, including community groups, unions, and business, will provide grounded solutions at the scale and scope necessary to build a carbon-neutral economy. [...]

Based on the identification of priorities, the [County] could work with at risk communities, labor, and business—again, ideally through regional industry partnerships such as the HRTPs—to develop and propose a set of key criteria for transition programs that include a combination of income and benefits support, skills training, and job creation and placement. Ultimately, any program will need to be directly beneficial to the specific region and industry affected. Potential benefits could include income support; continued pension and healthcare benefits; a bridge to retirement for older workers; sizable job training, re-training, or education allowances and case management to improve the likelihood of reemployment at comparable wages; consideration of guaranteed employment in public works or first source privilege in hiring; and even outside the box ideas such as college aid for the children of displaced workers.¹⁷⁹

¹⁷⁹ J. Mijin Cha, “Chapter 4: Just Transition” in Zabin et al., “Putting California on the High Road: A Jobs and Climate Action Plan for 2030.”